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HENRY C. PEARSON, F.R.G.S., *Editor*

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EDITORIALS

Rubber and Retaliation

LENIENCY in the collection of huge war debts is not the only American favor that many foreigners forget. They are unmindful, too, of the fact that "Uncle Shylock," as they asperse him for suggesting something on account, has for nearly a century and a half made all their countries favored nations in selling goods, often taxing sales to his own nationals while allowing others to enjoy a considerable and sometimes an undeserved exemption. Since the adoption of the Constitution in 1787 the United States has under Section 9, Article I, prohibited the levying of any impost whatsoever on our exports; yet instead of such consideration evoking reciprocal manifestation of good will, practically the entire family of nations has contrived through taxes on their exports to make this country pay not only generous profits but also a large portion of their cost of government.

When, for instance, an American buys a home-built $1,000 automobile he must under the federal revenue act of February 26, 1926, pay an excise tax of 3 per cent or $30; yet if the same automobile is to be sold abroad the foreign buyer can get it for just $1,000. When an American buys a home-built $40 tire he must also pay $1.20, while any buyer overseas can get the same tire for but $40. Americans pay a sales tax on every ton of coal they buy in Pennsylvania and West Virginia, but aliens abroad can buy the coal at mine cost. The United States buys an immense amount of tin from the Federated Malay States, yet our manufacturers since 1903 have not only been paying a large export tin tax but have also been seriously handicapped with the preferential drawback enjoyed by British manufacturers. So, too, has it been with hides and skins from British India since 1919, and with much other foreign raw material.

Even though Americans may buy 85 per cent of the British colonies' output of crude rubber, and perforce pay not only an artificially enhanced planters' profit but also high export duties to benefit the British dependencies, they may indulge in no retribution. Their fundamental law forbids levying a tax of even a cent a pound on any goods made of the rubber and to be sold abroad. It is true that under Section 317 of the United States Tariff Act of 1922 the President is authorized to impose retaliatory duties to offset foreign discriminations directed at American commerce, but he does not exercise such prerogative. An export tax would be one of the most effective weapons that he could use, but the Supreme Court has repeatedly declared it to be invalid because unconstitutional.

Of course this nation could amply defend itself on this score by abrogating the prohibition of an export tax; but the reconciling of so many conflicting home interests and the securing of concurrence by at least thirty-six states, the national congress, and the President in a repealing amendment to the Constitution is obviously no simple task. Perhaps when the inside story is finally told it will be found that the astute British Privy Council well realized this weakness in the American position when it sanctioned rubber restriction and through adroit arrangement of export duties unduly raised the cost of rubber.

More and Cheaper Rubber

"THE plantation rubber industry, which represents an investment of over a hundred millions sterling of British capital," says a spokesman for the rubber growers, "will not be on a sound basis until the disparity between the consumption of rubber in tires and the consumption of rubber in other articles is removed by the extended use of those other articles, and by the establishment of new uses involving the consumption of rubber in large quantities."

New uses for rubber are being found almost daily, but the high percentage required for tires shows no sign of abating; and now with the American rubber buying organization functioning efficiently the chances of planting interests getting business on a sounder (and still more profitable) basis, even with government aid, do not appear bright.

"Rubberware" Not Copyrighted

ONE of the reasons why the term rubberware has not been more generally used is that, while many manufacturers have been willing to employ so comprehensive and etymologically correct an expression, they have had the quaint notion that the word had been copyrighted. The Reliance Rubber Company, Ltd., of London, writes that because they have long used the word rubberware in their advertising many have regarded it as a trademark of the Reliance concern, which the latter frankly disavows. Noting this journal's advocacy of the universal adoption of the term, the Reliance concern remarks that its general acceptance should be of decided benefit to the rubber industry and observes with satisfaction that British retailers are now establishing "rubberware departments."

* * *

ALTHOUGH RUBBER KEEPS WELL ABOVE PRODUCTION cost, some high and safe solvents at least have "hit the toboggan." In 1923 ethylene dichloride was scarce at 35 cents a pound, in 1924 it cost 25 cents, but now it is said to be plentiful around 6 cents.

In this and succeeding articles those compounding ingredients will be considered which are employed in current rubber practice beginning with factice, which is classified as a softener

Rubber Compounding Practice[1]

WEBSTER NORRIS

THE materials treated in this and succeeding articles will be taken by functional groups as commonly followed in mixing. This plan is impartial and independent of the merits of the ingredients technically and economically. The first group is composed of softeners beginning with factice. The sequence followed in the items of any group is without significance.

The first step in making rubber mixing is plastication of the crude rubber and reclaim base. The materials used for this purpose are classed as softeners, although some of them function also in other ways as will be indicated farther on. The material known as factice, commonly referred to as rubber substitute, was discovered in 1847, and its industrial development began in France about 1870. It finds extensive use in England and on the Continent. Although it has not attained so great importance in American practice, it is employed in many diversified lines of goods because of the assistance it affords in processing, the finish it imparts to rubber surfaces and its beneficial effect on the aging of the product.

The rubber worker's interest in any compounding ingredient centers in (1) its chemical and physical properties, (2) its effect on processing, (3) its technical value and durability of the goods containing them, and (4) on its economy or volume cost. These considerations lead to careful testing and comparisons and more satisfactory compounding.

Factice or Rubber Substitute

Factice is a more or less firm resilient material resulting from the vulcanization of refined rape seed, cotton seed, corn or soya bean oil. It is white or brown, according to the process of manufacture.

White factice is made by adding slowly to refined rape or corn oil at low temperatures, a solution of sulphur chloride. The reaction is attended by the evolution of considerable heat and results in a rapid solidification of the material. Lime or magnesia are used as stabilizers and prevent any residual acidity. The gravity is regulated by compounding with inert materials to specified limits.

Brown factice is made by heating the oils, singly or blended, with sulphur. The reaction extends over a considerable period of time and the consistency of the product falls in one of three classifications—hard, medium, or soft. Its hardness, adhesiveness and free oil are controlled by proportioning the oils and sulphur and by regulating the reaction.

There are about 15 grades of white factice and as many of brown. The standard grades of each color are nine in number, derived by making the three consistencies from three straight or mixed oils as follows: (1) all rape oil, (2) all corn or soya bean and (3) blended rape and corn. The remaining grades of white and brown are specials made from blends of oils compounded with gums, waxes and other materials to give definite results in processing or requirements of economy.

In other words, manufacturers of factice make their products under careful chemical and mechanical control and are able to produce with exactness any grade or characteristic desired. White factice is offered in dry solid form, ground or in a sticky mass. Brown is usually in solid form and rarely ground. White and brown factice are similar in chemical and physical characteristics. Their chemical inertness, adhesiveness and resilience give factice a certain likeness to crude rubber and account for its being called rubber substitute. The resemblance, however, ceases there, since the material is without tensile strength or ability to elongate under stress.

Specifications[2]

Specifications for factice cover the items of market form, color, free oil, free sulphur and mineral content.

Color requirements apply only to white factice. It is entirely relative and made by comparison with a set of standard samples. Color in white factice may be affected by mineral content. In the case of a brown factice containing only oil and sulphur, the color affords the expert a means of estimating what vegetable oil it contains.

Fineness of factice is not a very important factor for the speed at which factice incorporates with the gum, and reclaim on a mill is not proportional to its particle size. Factice practically dissolves freely in the broken down rubber on a mill which grinds it at the same time.

The ash or mineral content runs from 2.5 to 50 per cent in the various grades of white factice. A sample showing 2.5 per cent mineral carries the minimum amount of neutralizing material necessary to insure the aging qualities for which factice is well known. A sample having more than 2.5 per cent mineral contains pigment incorporated to obtain a desired result in rubber compounding or simply as a cheapener.

The mineral content of brown factice should run less than 0.5 per cent in all cases where oil and sulphur alone are used in its manufacture. Any excess above this figure indicates either the direct addition of a pigment or the use of some wax or gum in the compound, the ignition of which increases the ash of the factice. The ash test is preferred to specific gravity, because easier made and serving the same purpose.

Free sulphur in white factice should not exceed 0.5 per cent; that of brown ranges from one to eight per cent.

The acetone extract indicates the free oil and free sulphur. The free oil in factice is that portion of the original oil which has not been vulcanized to the point at which it ceases to be soluble in acetone. The case of free sulphur is more complex. The sulphur appearing in the acetone extract of white factice is most probably uncombined and introduced as sulphur dissolved in the vulcanizing agent, sulphur monochloride. In the case of brown factice, the free sulphur is made up of the sulphur combined with the partially vulcanized oil and the sulphur not combined at all.

Under free oil two cases require particular mention. Non-vulcanizable petroleum base oil, when used in the manufacture of white factice, appears in the acetone extract and is considered as part of the free oil. Waxes, gums and greases when used in the manufacture of brown factice also appear in the extract and are considered part of the free oil. The petroleum base oils remain

[1] Copyright 1927 by Webster Norris. Continued from THE INDIA RUBBER WORLD, June 1, 1927, pp. 127-128.

[2] From "Measurement of Quality of Factice." By Kingsley Gillespie, The Stamford Rubber Supply Co., Stamford, Connecticut. THE INDIA RUBBER WORLD, April 1, 1926, pp. 18-19.

Typical Compounds Containing Factice

PENCIL ERASER

Rubber	20.00
Dry white factice	20.00
Crimson antimony	2.00
Paris white	39.00
Pumice	12.00
Sulphur	0.75
Magnesia	2.00
Petrolatum	4.25
	100.00

Press cure, 15 minutes at 45 pounds.

DOUBLE TEXTURE

Roll brown crepe	6.0
Shoe reclaim	45.0
Paris white	23.0
Litharge	5.0
Brown sticky factice	15.0
Mineral rubber	5.0
Sulphur	1.0
	100.0

Acid cure, 35 to 40 minutes at 110° F.

RED DIPPING CEMENT

Rubber	50.0
White factice containing mineral oil	5.0
Crimson antimony	18.0
Paris white	25.0
Zinc oxide	1.0
Lime	0.5
Accelerator	0.5
	100.0

Cure, 25 minutes to reach 286° F.; 60 minutes at 286° F.

TAN HEELS

Inner tube reclaim	47.0
Sticky factice	15.0
Red oxide	1.0
Whiting	30.0
Lime	3.0
Sulphur	4.0
	100.0

Cure, 12 minutes at 75 pounds.

RED TUBING

Latex crepe	36.0
White factice, dry	4.0
Crimson antimony	8.0
Red oxide	8.0
Zinc oxide	10.0
Lithopone	32.0
Lime	0.5
Accelerator	0.5
Sulphur	1.0
	100.0

Open cure, 1 hour at 45 pounds.

FRUIT JAR RING

Tire reclaim	30
Mechanical blend reclaim	52
Mineral rubber	10
Sticky white factice	5
Sulphur	2
Rosin oil	1
	100

Open cure, 25 minutes at 35 pounds.

WHITE DOUBLE TEXTURE PROOFING

First latex	10
White reclaim	20
Sticky white factice	5
Dry white factice	3
Lithopone	8
Whiting	54
	100

Vapor cure, 35-40 minutes at 160 degrees F.

GARDEN HOSE TUBE

Roll brown crepe	10.0
Inner tube reclaim	10.0
Shoe reclaim	25.0
Medium brown factice	8.0
China clay	25.0
Whiting	14.0
Litharge	4.0
Lime	1.0
Sulphur	3.0
	100.00

Open cure, 1½ hours at 45 pounds.

unchanged, but it is a question whether the gums are not partially transformed during the process of vulcanization.

The presence of starch in factice is undesirable because it is not stable. Fish oil as a component of factice is also inadmissible because it is malodorous and does not age well. If present, it is merely as a cheap substitute.

Factice in Compounding

Factice exerts certain definite effects in rubber compounding, both chemically and physically. Brown factice does not interfere with the functioning of accelerators, but white factice retards the action of nearly all of them. This effect can be overcome by increasing the proportion of accelerator.

Factice is milled directly with the crude rubber. It freely commingles or dissolves in the gum, improving its plasticity, causing it to wet or smear the particles of the earthy compounds added later and thus facilitates rapid and uniform mixing. This property of conferring smooth working quality to the rubber mixing is an important function of factice because it increases speed and exactness to every machinery process and imparts to the finished goods a velvety surface and to molded articles ease of filling and removal from the molds. This improvement in plastic quality is also valuable in the case of cheap, heavily loaded stocks containing dry reclaims as they can be made workable by the addition of sticky factice. In this case a distinct lessening of gravity is possible as well.

In rubber goods factice improves aging due to its own stability, its oily components which in intimate contact with the rubber protect it from the drying and oxidizing influence of sunlight and included air.

The practical value of factice in rubber work does not pass unquestioned by many rubber chemists and rubber compounders. While their position is a strong one and in line with progressive tendencies the use of factice continues in rubber goods manufacture.

Wherever pliability is of greater moment than tensile strength some grade of factice in larger or smaller amount is advantageous. In this connection it is found in the formulas of some frictions, tire sidewalls and other applications indicated above. The compounder can reduce gravity and volume cost with factice, and increase tackiness without injury to his stocks.

Factice in proofing speeds up the spreader output, allows thinner coats to be applied, gives better anchorage to the fabric and a smoother finish. In druggists' sundries it produces softer and more pliable goods, speeds production, gives better finish to molded articles and makes it easier to remove them from the molds.

In tubing machine products, speed of production and exactness of gage are important factors influenced in large degree by factice. Tubing, whether of cheapest or most expensive quality, gains in finish, pliability, color and aging quality.

The manufacture of erasers supplies the greatest single outlet for factice. In this case, it is ideal and indispensable, for under abrasion it yields a crumb which readily absorbs pencil marks. In fact, tons of erasers are made with factice alone, as well as in combination with rubber.

In dipped goods cement, a special white factice is desirable. Here a grade of snow-white factice, made from a blend of rape seed oil and a mineral oil, yielding a high acetone extract, improves the dispersion of the rubber in less solvent, lowers the viscosity of the cement and makes it smoother.

Selection of Factice

For general compounding, the following grades of factice suffice for the applications indicated. Naturally the compounder will use the hard, medium and sticky grades to counteract an excess of these qualities exhibited by the other ingredients to produce a compound of the working qualities desired.

TYPES AND USES OF FACTICE

Grades	Uses
Dry white, low extract	Proofing, erasers, wringer rolls, fruit jar rings, frictions, sponges.
Sticky white, high extract	Floor tiling, fruit jar rings, tire side walls, sponges.
Hard brown, low extract	Automobile topping, calendered goods, sponges.
Medium hard brown, medium extract	Inner tubes, tubing machine products, heels, small molded articles.
Sticky brown, high extract	Mechanical goods, footwear, sponges and to equalize hard and dry ingredients, as reclaims.

Factice is admissible in compounds for a large variety of rubber goods in which the maximum of tensile properties is not essential as, for example, when ease and speed of production, pliability, color, gravity, freedom from blooming and odor and low volume cost are required. The selection and proportioning of the factice used is regulated by the judgment of the compounder, based on the kinds of rubber and reclaims employed, the processing and service expected. The practical formulas given above are illustrative of the way factice may be used. Like most other rubber mixings they serve as suggestions to the compounder in the solution of actual problems.

Rubber Insured Lindy's Safety

Gasoline and oil feed lines were encased in soft, elastic tubing to absorb dangerous vibration. Other rubber accessories, in addition to Silvertown tires, were landing gear shock absorbers, and an inflatable rubber airaft

Colonel Charles A. Lindbergh and his record making airplane *The Spirit of St. Louis.*

HOW the safety of Colonel Charles A. Lindbergh was greatly insured and the success of the famous flight from New York to Paris was largely aided through the agency of rubber were but little realized in the furore over the brilliant feat of the young American airman. Yet rubber played an important, though inconspicuous, part in the great leap over the Atlantic.

One of the constant anxieties of fliers is possible leakage in oil or gasoline tubing, or at the joints or connection. Leaks may start when the motor is reaching high speed or even when the plane is being bumped in combating adverse air currents. At any rate excess vibration is a hazard, and to it may be traced many grievous disasters in aviation. It may easily loosen couplings or it may do very serious damage by crystallizing, particularly the ¼ or ⅜ inch copper tubing between the gasoline tank and the motor, so that the tubing may split or develop fissures, and by failing to properly deliver fuel to the motor cause the latter to either miss or go dead. Fire may even be caused by a leak.

Rubber Floated Gasoline Lines

The Ryan Airlines, Inc., of San Diego, California, which built the Spirit of St. Louis, William M. Bowlus, factory superintendent, and Donald Hall, chief engineer, who supervised its construction, were resolved that Lindbergh should not be imperiled through the incessant yet unavoidable agitation in the piping attached to the powerful motor that propelled his plane for 33½ hours. So, to minimize vibration they not only kept the feed lines short, well within two feet, but also "floated" the lines in rubber. This, the builders say, made them unfailing. To THE INDIA RUBBER WORLD's representative, the Ryan company thus explains this interesting detail in metal-shock absorption:

"The gasoline lines were of copper tubing, and to prevent any vibration we used ordinary soft rubber hose over all joints in the oil lines and gasoline lines. In several places we put the rubber hose over the tubing where there was special vibration."

It is not claimed that the use of rubber on feed lines was original with the builders of the Lindbergh plane, but rather that in that plane rubber was more freely and uniquely employed.

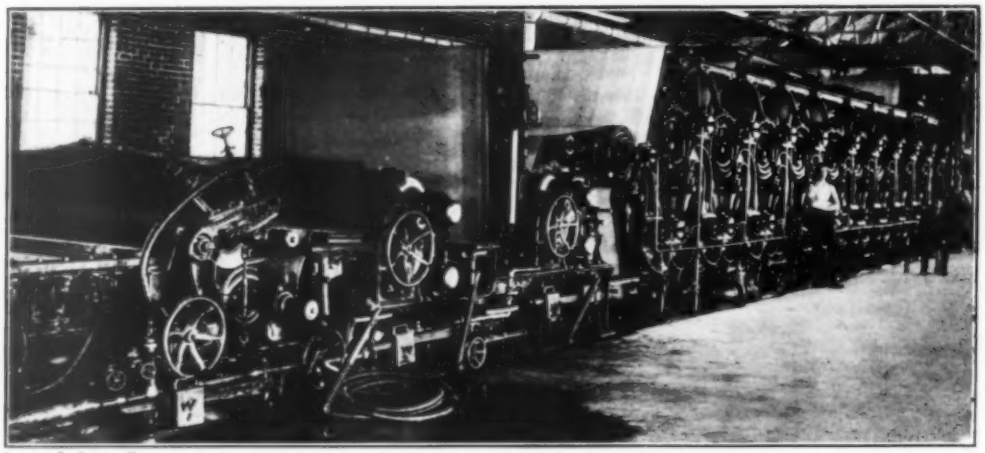
Other Rubber Accessories

Other rubber accessories, in addition to a pair of Silvertown 30 by 5-inch airplane tires, carried on the Lindbergh plane, were two trombone type shock absorbers made of eight separate links of multiple-strand rubber cord with braid overall set on the landing gear, and also an inflated rubber airaft which could be used in the event of forced landing on water.

Checking Vibration on Army Planes

In the United States military service soft, small-bore rubber hose in 2- to 5-inch lengths has been somewhat similarly used on many planes. Such short sections slipped over the ends of oil and water lines especially have afforded serviceable flexible connections wherever much vibration was likely, or wherever it was unhandy to make rigid pipe attachments.

Another way of using rubber to counteract vibration in airplane oil and gasoline feed lines has been as an interlayer in double woven wire tubing, somewhat resembling the flexible metallic tubing used on automobile grease guns. Such airplane tubing has a tight inner and outer braiding of flat and narrow steel wire, and between the two is a thin jacket of specially-compounded rubber. It is said to have proved quite a serviceable jar absorber in many military tests. Some builders, while conceding its merit on oil lines, have hesitated about using it on fuel lines. They have feared that the rubber may be dissolved in some degree by the highly volatile casing-head gasoline which aviators use, and that through the entrance of even minute quantities of gum into the carburetors a motor may fail to operate at maximum efficiency for long periods.



Pusey & Jones Corp.

PART OF A FOURDRINIER PAPER MACHINE
Note Weights *W1* and *W2* on the Compound Levers—The Former on the Couch Roll and the Latter on Press Rolls

Rubber in Paper Machinery

Every Pound of Paper Used by Civilization Owes Its Perfection of Finish, Comparative Strength and Quality to the Judicious Use of Rubber Covered Rolls

THERE is no manufacturing process that depends more on rubber for successful operation than the art of paper making. Rubber is essential at critical points in the construction of a paper machine and where the quality and finish of the output are dependent on the proper use of vulcanized rubber.

There are many rubber rolls in auxiliary paper making machinery but this article will be devoted to the paper machine proper, in which the following rubber covered rolls are used: The couch roll; a large number of carrier rolls; from two to six wringer rolls; three or four press rolls; one and sometimes a pair of smoothing rolls; and in the case of coated papers a pair of size rolls.

Couch and Press Rolls

The couch roll, so called because it is the birthplace of the new paper, runs in size from eighteen to thirty inches in diameter and from one hundred to two hundred and fifty inches in face according to the size of the machine. The couch drives the continuous Fourdrinier wire cloth on which the paper is formed. The liquid paper stock flows from the breast roll to the couch roll on the upper return of the wire cloth. The moisture is gradually removed from breast to couch roll by the capillary action of the revolving brass table rolls that support the wire. The stock at the breast roll is prevented from flowing over the sides by rubber deckle straps which travel with the moving wire and return over a pair of deckle pulleys after following the wire until no longer required because sufficient moisture has been removed to allow the paper stock to stay on the wire. Deckle straps have been replaced on some slow-moving machines by a water-jet. No suggestion has yet been made to replace deckle straps on large high speed paper machines.

As the paper stock travels down the wire it loses moisture, first by action of the table rolls then by reason of the absorption of the suction boxes and finally by being squeezed between the upper and lower couch rolls. The lower couch roll is sometimes covered with rubber. At this point the paper is sufficiently formed to allow it to be handled by the papermaker and passed from the face of the wool covered upper couch roll, to which it clings, on to the first press felt. The Fourdrinier wire return to the breast roll is carried on rubber covered rolls varying from six inches up to fourteen according to the width of the machine. The thickness of rubber covering on the couch roll is generally one inch and that on the carrier rolls from one-eighth to one-quarter of an inch. From the couch rolls the paper passes through from two to four pairs of press rolls. The lower roll of each pair of press rolls is covered with rubber at least one inch thick, and in the case of high speed machines it would be better if the rubber was two inches thick.

The press felts that carry the new moist paper between the "nips" of the press rolls are made of the finest wool obtainable and are about a quarter of an inch thick. These felts are very expensive and when the nap is worn off are discarded. This happens in a few weeks, often because the rubber covering on the press rolls is too hard, or shows a tendency to corrugate. Often the wear of the felts is due to the press rolls not being crowned correctly in which case the felts either run ahead or lag behind at the center. A high speed news machine will make paper at the rate of well over 1,000 feet a minute. This means over 300 miles of paper in a day or 90,000 miles a year. Such a sheet of paper over twenty feet wide would wrap around the world nearly four times. It is evident all this means a quick wearing away of the nap of a felt. It is for this reason as well as the necessity of a uniform thickness and dryness of sheet that the papermaker requires unusually soft and thick rubber covered rolls.

Carrier and Wringer Rolls

In addition to the couch and press rolls there are rubber covered rolls in the paper machine, principally felt carrier rolls and wringer rolls for squeezing the felts dry. Some of the felt carriers are called stretcher rolls because the double helical "worms" constrain the felts and overcome their inclination to

lump towards the center. For the sake of the expensive felts these carrier rolls on high speed paper machines are now covered with rubber although in slower machines they are brass covered. It is probable that the owner of the slow-speed machine could well afford replacing the brass covered rolls with rubber rolls. While the saving per unit of time would not equal the saving so effected on a high speed machine it is evident that this saving expressed as a percentage of felt costs would be identical and it might pay in many cases to make the change.

The smoothing rolls are really an additional press installed with the special purpose of smoothing out the wire and felt marks on the paper while it is still soft and before these marks become indelibly impressed in it by the action of the hot drying cylinders. A size press consists of a pair of rubber covered rolls, the lower roll running in a bath of size liquid so as to coat the paper as it passes through the nip of the rolls. Both the smoothing and sizing rolls are rubber covered though sometimes one of the pair is brass covered for the sake of the smoother surfacing. In the case of the smoothing and sizing rolls, as distinguished from the press rolls, there is no felt carrying the paper which therefore comes into direct contact with the surfaces of the rolls.

Soft Thick Rubber Rolls Required

In the old days the papermaker was satisfied with one-half inch coverings made of hard rubber such as used for telephone receivers and mouth pieces. In course of time this was followed by a type of rubber much better from the papermaker's point of view. It was almost as hard by test but was much softer and less liable to be fractured by a chance blow. This was favorably received at first but soon the demand for rubber coverings grew as paper machines became larger and ran more swiftly. Then the papermaker began to realize the saving in felt wear, as well as the greater control of uniformity in thickness and drying due to softer rubber coverings. It was found that the Fourdrinier wires costing several hundred dollars each and lasting only from ten days to six weeks would double and treble their service if the couch roll over which the wire passed was covered with thick, soft rubber. Then came the troubles caused by "corrugating" which were for a time overcome by the use of plantation rubber.

Within the last few years, however, paper machines have grown until they are three times as wide and run three times as fast as in the old days. The papermaker is now looking for rubber coverings up to two inches in thickness and hoping to get such coverings with a plastometer reading of about eighty, whatever the price might be.

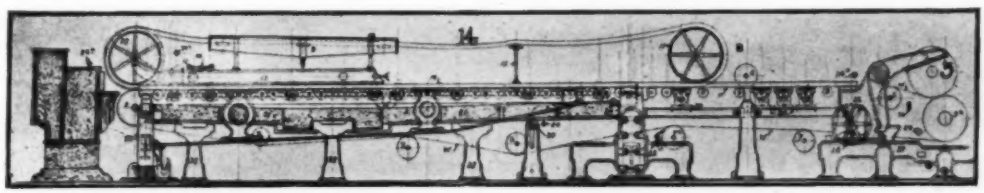
The Physics of Rubber Covers

It is an axiom in physics that the compression of any substance under pressure is proportional to the pressure exerted per unit of its surface area, and to the compression resistance of the substance itself. For instance, pressing your finger against your desk will compress both the finger and the desk in proportion to the hardness of each subject. You can see that your finger is indented but you will find it hard to believe the same fact applies to the desk because the indentation is so small that it is not detectable by our comparatively coarse sensibilities.

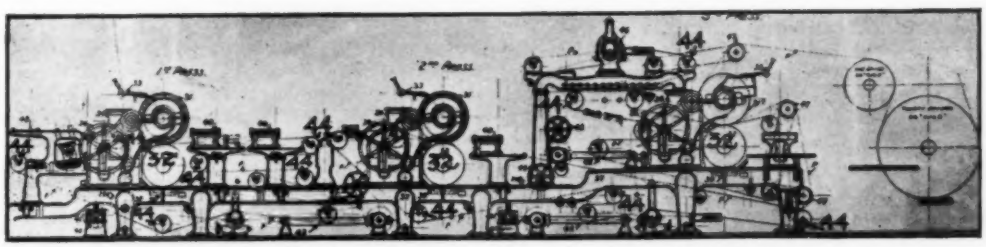
There is no material that illustrates the effect of applied force so well as rubber as evidenced by deformation of the surface to which the force is applied. Glass is more elastic in that it recovers its shape more quickly after the removal of the deforming force, but it is so hard that we cannot with our relatively dull senses detect its elasticity. Cork is a very elastic substance but owes this quality largely to its porosity. Commercial rubber as the papermaker uses it on the rolls of his machine is a striking example of elasticity in its response to and recovery from the effect of pressure applied to its surface. On this quality the art of papermaking is greatly dependent.

Let us consider the lower rubber covered press roll which may be twenty feet long and forty inches in diameter with a covering one and three-eighth inches thick as a maximum at present attainable. Such a roll has to sustain its own weight plus the weight of the upper press roll—sometimes a solid cylinder of granite—plus an additional load applied by weights hung to the journals of the upper roll so as to permit the machine tender some control of the contact between rolls at the center of the machine. It is evident that if we press down on the outside of the bearings that the pressure will, through the journals to which it is applied, tend to lift the center of the upper roll. Like the indentation of the desk surface it is not detectable to the eye but evident in the results as shown by the paper being made.

These weights are hung on compound levers, and while the weights themselves are comparatively small they act through a large leverage to obtain the effect desired. It is evident from the above that the load on the lower rubber covered press roll, considered as a beam, is very large and that this must cause it to deflect or sag at the center. Such a condition would cause an uneven line of vertical contact between the two rolls just where the paper is being squeezed. This means a lack of uniformity not only in the amount of moisture removed at different points but also a difference in thickness of the paper. In order to overcome this condition the press rolls are "crowned"

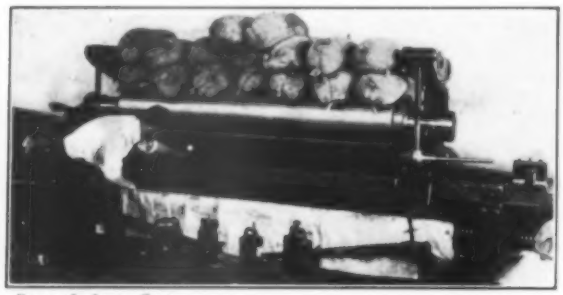


Fourdrinier Machine—Wet End. Deckle Straps *14*. Couch Roll *3*



Fourdrinier Machine—First Drier. Press Rolls *32*. Carrier Rolls *44*

and as a rule all the "crowning" is done on the lower rubber covered roll. A roll is said to be crowned when the diameter at the center is greater than the diameter at the ends; the crowning may exceed one-sixteenth of an inch in some cases dia-



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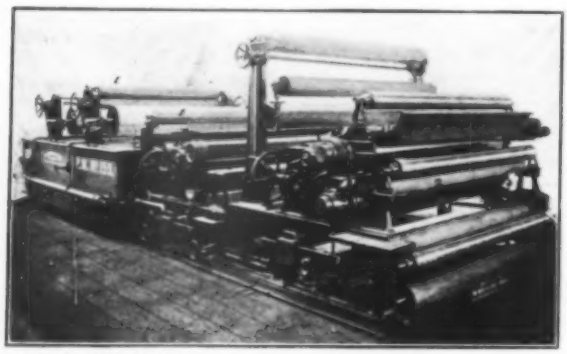
Testing Crown of Rubber Covered Roll

metrically speaking or over three-sixteenths circumferentially. Soft rubber will soon give at the ends and let the center touch if the crown is too small or vice versa if too large. After the lower rubber covered roll is crowned, it is well to put it back in the machine and chalk a streak, say two inches wide on its upper surface. The upper roll is then placed on it and the weights shifted until the average working pressure is on the roll. When the upper roll is then raised the mark of contact so obtained should be of even width if the crowning, the quality of rubber and the working conditions are correct.

In general in the paper trade we classify hardness or density of rubber about as follows:

Plastometer readings from forty to fifty with one-eighth inch ball is pretty hard and should be used only where grinding facilities are poor and the machine is small and of slow speed and not then unless considered necessary. From fifty to sixty is a very good general hardness for rubber covered rolls giving a fair life of press felts and can be used for carrier rolls. From sixty to seventy is a very useful soft rubber but requires grind-



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Cylinder Machine—Wet End

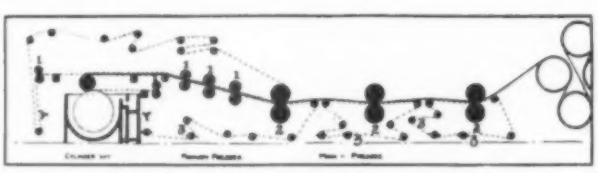


Diagram of Cylinder Machine—Wet End
Squeeze Rolls *1*. Press Rolls *2*. Carrier Rolls *3*.

ing every three or four months, this should go into the hands of up to date people who realize how to use the rolls without too much pressure, with a real knowledge of the amount of crown required in regard to pressure used, so you will not hear too much about corrugating which is often really a measure of poor operation rather than faulty coverings. Such a mill will also know what felt replacements are and the cost of them with respect to using rubbers requiring more or less grinding according to hardness. Plastometer seventy to eighty is about the last word in soft rubber but it is specified by the most up to date mills who appreciate to the full the saving effected by soft rubber on press felts and are quite willing to gain these results by grinding rolls every few weeks. These are the people who can see the advantage of rubber covered felt carrier rolls.

The accompanying illustrations indicate the position of the different rolls named in this article. The article itself is written largely with the hope that it will spur the rubber manufacturer into greater efforts to help the papermaker by finding out how to give him thicker, softer and more uniform coverings than he can now obtain, and to educate him into the use of more rubber covering on rolls that carry, guide or reverse direction of expensive felts and wires.

Legal Decisions

TIRE CASING. Patent No. 1,629,517 issued to Thomas C. Marshall May 24, 1927, for an improvement in tire casings, on application filed August 29, 1922. Claims for method of making tire casing wholly of rubber allowed. This is an appeal from a final rejection of claims 1 to 7 inclusive.

The decision of the patent examiner is affirmed as to claims 1 and 7 and reversed as to claims 2, 3, 4, 5 and 6.

HALOGEN PROCESS. Patent No. 1,627,725 for process for combining halogen containing material with rubber or similar substances and products resulting therefrom, was granted to Charles E. Bradley and Willis A. Gibbons May 10, 1927, on application filed June 20, 1921.

Because applicants' disclosure did not include certain proportions used by a patentee, in the patentee's process of treating rubber, the applicants were not permitted to have these patented claims for interference.

Customs Appraisers' Decision

SQUIRT VIOLETS. Classified as toys at 70 per cent ad valorem under paragraph 1414, tariff act of 1922, these are claimed dutiable at various lower rates. Opinion by J. Sullivan. The violets were held at 25 per cent as manufactures of rubber under paragraph 1439, as claimed.—*Treasury Decisions*, Volume 51, No. 19, p. 24.

Patent Suits

The Litchfield patent, No. 943,358, for pneumatic tire, claims 1, 2, and 4 held invalid for want of invention (C. C. A. Ohio). Goodyear Tire & Rubber Co. v. Michelin Tire Co., 18 F. (2d) 216.—*Official Gazette*, Volume 359, page 1.

No. 1,092,078. Re. 13,626. M. C. Overman, vehicle tire, filed April 16, 1927, D. C., S. D. N. Y., Doc. E. 41,152, O. & W. Co. et al v. Goodyear Tire & Rubber Co., Inc.—*Official Gazette*, Volume 359, page 5.

No. 1,489,477. Bowes & Bowes, process for rubber patches, appeal filed March 31, 1927, 8th Cir., Doc. 7801, P. L. Knick (Knick's Mend-Rite Manufacturing Company) v. Bowes "Seal Fast" Corp.—*Official Gazette*, Volume 359, page 6.

FRENCH RUBBER IMPORTS

Crude rubber imports at the port of Havre, France, totaled 12,691 metric tons in 1926 as against 11,422 tons in 1925. The share supplied by the United States was 2,799 metric tons in 1926 as compared with 2,026 tons in 1925. The value of the rubber imported during the last quarter of 1926 dropped to 48,245,000 francs, or $1,628,000, compared to 77,545,000 francs, or $3,118,000, for the last quarter of 1925.

Statistics of Crude Rubber Industry

Read at a meeting of the Institution of the Rubber Industry recently held in London. H. Eric Miller, the well-known authority on plantation rubber, examines the available rubber statistics to determine their usefulness

Producing Countries

THE principal countries producing plantation rubber in the order of their importance are: Malaya, Netherlands East Indies, Ceylon, India, Sarawak, French-Indo China, British North Borneo, Siam, and various parts of Africa. The chief centers of wild rubber production are Brazil, Bolivia, Peru, Mexico, Central America, and parts of Africa.

Most of the rubber produced in Sarawak and Siam, part of that from British North Borneo, French Indo-China and Burma, and a certain portion of dry, besides almost all the wet rubber produced in the Dutch colonies, is shipped to Singapore and Penang.

The wet rubber is remilled in Singapore and loses a large percentage in dirt and moisture in the process, therefore to arrive at net exports of Malayan rubber, 35 per cent must be deducted from wet imports to allow for this loss.

For the three years preceding 1926, accurate comparison of Malayan exports were made impossible by the unknown quantities of rubber smuggled out of the colony and reentered as Dutch native rubber. In Table 1 this smuggled rubber has been taken into account and the amounts estimated to be of Malayan origin have been excluded from the totals for Netherlands East Indies.

Outside of the Malayan ports mentioned above, Colombo in Ceylon is the only other place in the East which receives rubber grown elsewhere, in this case, in India. The local customs returns distinguished exports of Ceylon rubber from those of imported rubber, so there is no confusion here.

Exports of latex are usually given separately, in gallons, in official reports. In Table 1 they have been reduced to dry rubber content and added to the totals of the respective producing countries. Here it should be added that all figures of plantation rubber in Table 1 are for dry weight.

As for wild rubber, the gross weights only have been given in Table 1. Since importing countries, on the whole, do not allow for moisture or impurities in their import returns, the grand total of wild rubber exports should be strictly comparable with the grand total of net imports of these rubbers.

Rubber Imports

As for the imports, figures are mostly obtained from official customs returns and represent only the amounts retained by the respective countries. France, Germany, Italy and Japan include gutta percha with their rubber, but the gutta percha amounts are small and therefore do not greatly affect the totals.

The grand totals given in the last column of Table 2 represent the quantities of rubber retained each year by the manufacturing countries and after allowing for the difference in quantities afloat at

TABLE—1

NET EXPORTS OF CRUDE RUBBER, 1910-1926

	Plantation									Wild			
Year	British Malaya (1)	Netherlands East Indies (2)	Ceylon (3)	India (4)	British North Borneo (5)	Sarawak (6)	French Indo-China (7)	Siam, etc. (8)	Total (9)	South America (10)	Other Wild (11)	Total (12)	Grand Total (13)
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
1910 ...	6,500	2,400	1,600	200	100	10	180	10	11,000	44,000	39,000	83,000	94,000
1911 ...	10,800	2,300	3,200	400	100	30	200	70	17,100	43,000	33,000	76,000	93,100
1912 ...	20,300	3,700	6,700	700	200	100	250	150	32,100	49,000	31,000	80,000	112,100
1913 ...	33,600	6,400	11,400	1,000	500	150	200	150	53,400	43,000	22,000	65,000	118,400
1914 ...	47,000	10,400	15,800	1,300	600	300	200	100	75,700	38,000	8,000	46,000	121,700
1915 ...	70,200	20,000	20,800	2,200	1,200	600	400	200	115,600	40,000	11,000	51,000	166,600
1916 ...	96,000	33,100	24,400	2,800	1,900	1,000	600	300	160,100	38,000	12,000	50,000	210,100
1917 ...	129,000	44,000	31,900	4,000	2,400	1,700	900	400	214,300	41,000	12,000	53,000	267,300
1918 ...	112,000	42,000	21,100	4,400	2,600	1,500	500	300	184,400	27,000	10,000	37,000	221,400
1919 ...	204,000	85,000	44,800	6,600	3,900	2,200	2,900	600	350,000	39,000	9,000	48,000	398,000
1920 ...	181,000	80,000	39,000	6,400	4,100	2,200	3,100	800	316,600	29,000	8,000	37,000	353,600
1921 ...	151,000	71,000	40,200	5,300	3,200	2,100	3,600	800	277,200	19,000	4,000	23,000	300,200
1922 ...	214,000	94,000	47,400	4,900	3,800	3,800	4,500	1,300	373,700	23,000	3,000	26,000	399,700
1923 ...	201,000	117,000	37,100	6,400	4,200	5,700	5,100	2,400	378,900	22,000	6,000	28,000	406,900
1924 ...	183,000	149,000	37,400	7,700	4,600	6,700	6,500	2,800	397,700	23,000	7,000	30,000	427,700
1925 ...	210,000	189,000	45,700	10,100	5,400	8,400	6,300	4,000	478,900	28,000	10,000	38,000	516,900
1926 ...	286,000	204,000	58,800	9,900	5,800	9,200	7,400	4,000	585,100	24,000	9,000	33,000	618,100

NOTE—Most of the figures in this table have been obtained from official sources. The exports of plantation rubber have been adjusted to allow for moisture, etc., in native rubber and for rubber smuggled out of Malaya during the last four years.

TABLE—2

NET IMPORTS OF CRUDE RUBBER, 1910-1926

Year	United Kingdom (1)	France (2)	Italy (3)	Germany (4)	Austria and Hungary (5)	Russia (6)	Holland (7)	Belgium (8)	Scandinavia (9)	Spain (10)	United States (11)	Canada (12)	Japan (13)	Australia (14)	Other Countries (15)	Total (16)
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
1910	20,500	3,800	1,800	13,700	2,000	6,000	1,800	2,200	1,100	400	42,200	1,500	700	400	300	98,400
1911	16,700	5,400	2,400	15,100	2,300	6,000	1,400	2,000	1,300	500	41,900	1,700	900	500	400	98,500
1912	18,700	4,600	3,300	15,400	2,600	7,000	1,400	2,500	1,400	400	56,000	2,500	900	600	400	117,700
1913	25,300	6,500	2,500	16,300	2,800	12,000	2,400	3,600	1,200	600	52,200	2,200	1,200	800	400	130,000
1914	18,500	5,000	2,700	11,000	1,900	11,000	1,800	1,500	1,300	600	62,300	2,500	1,000	1,000	300	122,400
1915	15,100	10,800	5,000	4,000	500	13,000	2,900	.....	2,000	1,000	99,000	4,400	1,700	1,500	400	161,300
1916	26,700	14,700	4,800	2,000	500	9,000	200	.....	1,800	1,700	117,600	4,500	3,000	1,500	500	188,500
1917	26,000	17,000	5,600	1,000	100	5,000	.....	.....	800	1,300	179,300	6,200	3,700	2,000	400	248,400
1918	30,100	18,000	7,100	.....	.....	.....	.....	.....	700	800	143,400	8,300	7,300	3,000	1,100	219,800
1919	42,700	20,100	9,900	4,500	300	100	2,800	4,000	3,200	3,700	238,400	8,800	10,000	3,500	1,800	353,800
1920	56,800	16,300	6,100	12,600	1,300	100	5,500	3,400	2,300	4,100	249,500	11,900	6,000	3,500	1,300	380,700
1921	42,100	14,800	3,900	21,600	2,400	200	1,000	1,700	1,300	3,600	179,700	8,200	21,000	3,000	1,400	305,900
1922	11,700	27,700	6,400	27,600	2,600	3,100	—3,800	200	1,700	600	296,400	9,400	15,000	2,500	2,000	403,100
1923	12,700	31,200	8,500	18,500	2,600	4,500	800	2,200	2,200	600	301,500	13,200	14,000	2,000	3,000	417,500
1924	—11,600	34,600	8,800	22,700	2,500	1,500	—800	2,700	2,900	1,000	319,300	14,300	16,000	3,000	3,500	420,400
1925	4,100	37,500	11,100	33,900	2,500	7,500	900	2,900	2,800	1,200	385,600	19,800	11,100	5,000	3,900	529,800
1926	84,900	38,900	10,200	22,800	3,000	7,000	2,700	2,500	3,300	1,500	400,000	20,400	17,000	7,600	4,500	625,700

Most of the figures in this table have been obtained from official sources. Several of the countries prior to 1914 included reclaimed and scrap rubber amongst their imports of crude, and a few countries may do so still.

the beginning and end of each year, the net exports for any one year should balance the net imports for the same year. Unfortunately there is no record anywhere of the total quantities afloat at the end of each year. However, examination of export statistics for the last few weeks of any year should permit the estimate, both of quantities afloat at the end of the year and of the differences in the quantities afloat between one year and another.

Before 1921, a very close comparison of figures is hardly possible. From figures of monthly shipments it is found that during the last few weeks of 1921 and 1922, exports were slightly below the corresponding shipments in the preceding year, so that net imports during each of those years could be expected to exceed slightly net exports, which is in fact the case.

Again shipments during the last weeks of 1924 were greater than in the corresponding period of 1923, so that net exports for 1924 should be greater than net imports. Which again is the case. But a comparison of 1923 and 1922, 1925 and 1924, 1926 and 1925, shows a discrepancy. In 1923, 1925 and 1926, net exports should have been greater than net imports, but net imports actually show an excess of 11,000 tons in 1923, 13,000 tons in 1925 and 8,000 tons in 1926.

Mr. Miller believes that the error must be sought in the import figures and he turns to the United States, which takes practically 70 per cent of the world's output and is at the same time practically the only country for which the required figures are available. And he finds from a comparison of gross imports, as given by the American customs returns with the export figures to America from producing countries, that in 1923 the United States figures showed an excess of 17,000 tons, in 1925 about 19,000 tons and in 1926 about 13,000 tons, which would account for the discrepancy pointed out above.

Difficulty of Estimating Annual Production

The real difficulty begins when it is desired to estimate real annual production and the real annual absorption and consumption. Here it should be mentioned that Mr. Miller distinguishes between absorption and consumption. Absorption is the amount of crude rubber converted into manufactured goods by the factories, but not yet used, while consumption represents the amount of manufactured rubber actually used and worn out.

No producing country reports the actual crop produced in a year and no manufacturing country, except to a certain extent America, reports the amount of crude rubber used by its factories in a given year.

If in the case of plantation rubber, the stocks in hands of dealers and others at ports of shipment at the beginning and end of each year were known, then by deducting the decrease or adding the increase in stocks in any year to the net exports for that year, a close estimate of the annual output of each producing country could be made. And if stocks of dry rubber on estates, in hands of upcountry dealers and in transit within the country, at the beginning and end of each year were known, then with a similar adjustment the real production of a country could be found.

In Malaya, stocks in hands of dealers and afloat in harbors and in hands of harbor boards are published each month, also exports from the restriction area—all Malayan, except the islands of Singapore and Penang—and stocks of couponed and uncouponed rubber held by dealers on the mainland, but no data on stocks of dry rubber on estates and holdings or in transit to ports are published at all.

The most accurate way of finding production would be to calculate the average yield per tappable acre and multiply that by the total number of tappable acres. Unfortunately there are no accurate data on the total planted or tappable area to be had.

In the Dutch East Indies there are no data of any kind for stocks and, as in Malaya, there is no complete census of the area under rubber, chiefly because of the difficulty of obtaining reliable figures for native holdings. The available information on estates is fairly complete, and the planted area of estate rubber as recently published is just over 1,000,000 acres.

From the foregoing it will be seen that soon after the end of each year enough data may be obtained to determine fairly accurately the output of that year, but that in the absence of reliable acreage statistics it is difficult to forecast future production for several years ahead.

Absorption

Leaving production and turning to absorption it is pointed out that with the exception of stocks, figures from London, Liverpool, Amsterdam and Antwerp and the absorption data from America, the net imports are the only guides to absorption.

For England, by adding the decrease or subtracting the increase in stocks in London or Liverpool, the quantities delivered to manufacturers can be arrived at and if actual stocks in factories do not vary much from year to year, these figures would fairly accurately represent absorption in England.

The absorption figures published for America by the Rubber Association are very useful as they are fairly reliable and represent the absorption of about 90 per cent of the American industry.

In estimating absorption from net imports, some of the moisture and other impurities of wild rubber will be included for countries outside of America. These countries together use about one-third of the total output of wild rubber. In America, some manufacturers include moisture and dirt in the amounts they report, but the majority deduct for moisture, etc., so that full deductions for moisture should not be made for wild rubbers.

In the distribution of absorption amongst various types of rubber manufacturers, which is quite as important, again the data for America collected by the Rubber Association offers almost the only guidance.

These figures show that at present 85.1 per cent of American absorption of crude rubber goes into automobile tires and tubes, including solid tires and tire sundries; 4.6 per cent into mechanical goods; 4.3 per cent into footwear; 0.9 per cent into insulating compounds; 1.3 per cent into soles and heels and 3.7 per cent into other goods.

For other countries, Mr. Miller guesses that about 70 per cent of the absorption goes into tires, and a fairly close estimate for the world would be about 80 per cent.

Consumption

In regard to consumption, the paucity of statistical data makes it practically impossible to know what the actual annual consumption is. But consumption is constantly increasing and it is much less subject to violent fluctuation than absorption. The most important aids in considering consumption are the annual output of automobiles in America and annual registration of autos in the world. Mr. Miller's method of showing trend of consumption is to average the absorption of every three years and to treat this average as indicating the consumption for the middle year. The figures thus obtained are presented in the following table:

TABLE—3

Trend of Rubber Consumption as Measured by a Three Years' Moving Average of Annual Absorption

Year	Three years moving average of annual absorption Tons	Percentage increase over previous year Per cent
1910	85,000	...
1911	90,000	5.9
1912	95,000	5.6
1913	107,000	12.6
1914	125,000	16.8
1915	150,000	20.0
1916	187,000	24.7
1917	221,000	18.2
1918	260,000	17.6
1919	287,000	10.4
1920	302,000	5.2
1921	322,000	6.6
1922	362,000	12.4
1923	430,000	18.8
1924	487,000	13.3
1925	525,000	7.8

In conclusion, the lecturer emphasized the immense benefit that would accrue to all concerned if the various governments and some central authority collected and collated accurate and complete statistical information, thus helping to ensure the future development of this most important industry.

Designs for Rubber Tiles

ALLAN WILLIAMS

IN designing rubber flooring the beauty of various patterns and color schemes is employed to improve the artistic value of the floor, and involve problems which must be considered. The cutting of the designs should not be too complicated, so that the machine employed in the cutting process can be easily handled. A forty-five degree angle for halves, quarters, and lozenges can be cut by means of a straight knife blade with a guide or jig. Moreover, the installation cost must be within reason as low cost of the finished product is an important factor in the rubber flooring industry. The coloring effect of designs can change the beauty considerably even though the same pattern is employed.

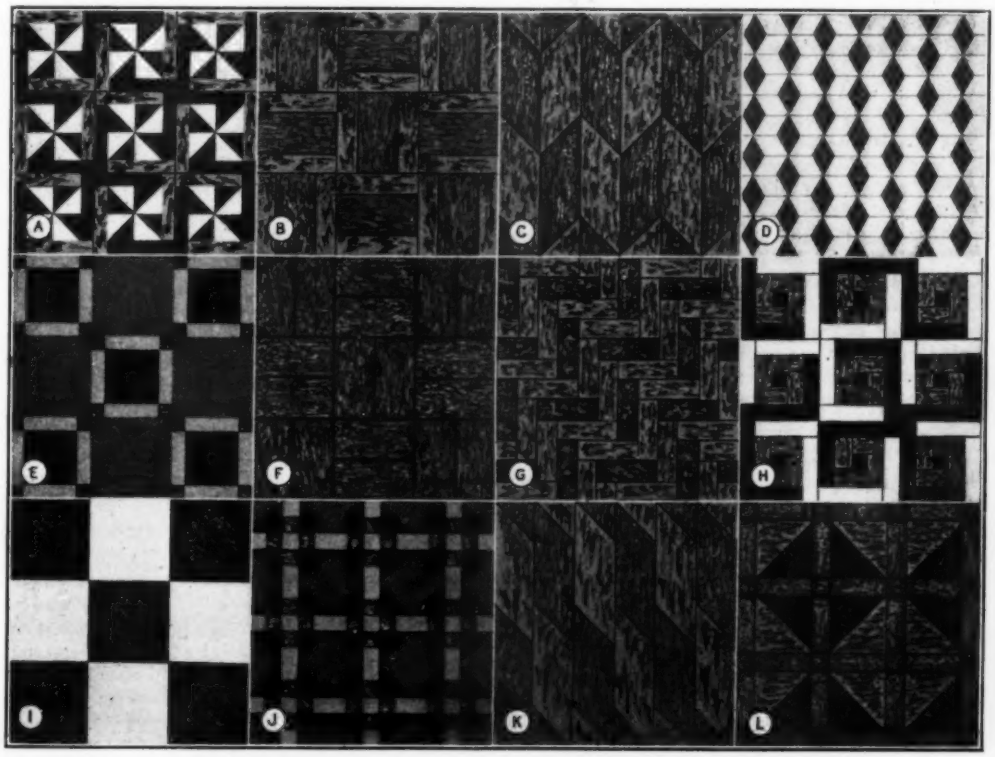
Referring to the accompanying illustration, *A* is a square design made in units, each containing four oblong tiles, two being lighter in color than the others, with the mottling running the longitudinal direction of the tile. The four dark halves of the tiles are placed in position with the longest edge pointing from the corner of the square of the unit to the center, and the light halves likewise giving the effect of a fan in the center. The complete units are laid adjacent to each other so that the two dark halves of the units meet at the corners making a cross. This design requires four different colors to attain the full effect of its beauty.

The triple basket weave, *B*, is made by cutting dark squares into half oblongs and the lighter colored squares into one-quarter of the longitudinal direction, requiring two times as many smaller oblongs as the large color. The two color design and mottling effect stand out most prominently.

The checker-board lozenge design, *C*, gives a novel effect and is deceiving to the eye, being laid with lefts and rights of both colors. The mottling can be used also in a solid color. Each tile is cut at a forty-five degree angle on each end, and the ends are parallel being twice as long as they are wide.

D is known as the rhomb design and, if laid with one dark diamond and two light ones as shown, it can be used in small rooms with good results. If a three-color effect is used with mottling running crosswise of the diamond, it gives the optical illusion of a pile of cubes, seen so much on advertising cards.

E is a plaid design having one large tile of a solid color and four oblong tiles of a plain color, four small square tiles at each corner which can be mottled or plain, with a large tile in the center of a plain color. The small square is the same width and breadth as the oblong tile is wide, and the oblong tile cannot be any longer than the width and breadth of the center tile of the unit. The complete unit must be the same width and breadth as the largest tile and laid in a checker-board style, thereby requiring four colors to complete the design. However, more can be added, as, for instance, the center one in the unit can be half tiles employing two light and two dark colors for the oblong tile.



Some Typical Rubber Flooring Designs

The double basket weave, *F*, is made by two oblongs forming a square. This design is used with mottling effect of one color, and if both oblong tiles are of the same plain solid color, feature joints make the design more prominent.

G, the herringbone basket weave, is laid square, the tiles being three times longer than their own width. This design is employed in linoleum as well as rubber flooring, with two light tiles together and one dark tile in rotation, adjacent to each other, in herringbone fashion. If three colors are used there must be two light shades so that the darker tiles will be more visible. Mottling or solid colors can be used with good results.

The dot and oblong design, *H*, is laid in units adjacent to each other, a dark square in the center and four oblongs around it, the

oblongs being the same width, but twice as long with the mottling running the long direction. The outer oblong of each unit is composed of two light and two dark tiles and eight dark tiles abutting each other on the ends, the same method being employed with the light tiles. Three or four different colors can be used to make this design.

I is a Roman design used years ago, being made of one large tile of a light color and a smaller tile with its diagonal width the same as the width of the large light tile. There are four small tiles with mottling effect cut right tile and running the same direction to the center tile, also laid diagonally. The small right halves are mottled and the large light tile is of a solid color. Three colors are required for this design.

The plaid design, *J*, employs one medium-solid color in the center of the unit laid diagonally, and four-quarter tiles with mottling running toward the center tile, four small squares of light color in each corner, and four oblong tiles the same width, but twice as long as the light tile placed on the sides. There are eight small squares of a medium color the same size as the four small squares which are placed in the corner, but mottled and with the veins all running in the same direction. Four colors are required for this design which has the effect of lattice work laid over a checker-board design laid diagonally underneath, each cross joint covering the center of each square tile.

K is a checker-board lozenge design similar to design *C*, but both tiles are lefts and are placed with one-third of their length beside each other, or a rip-saw joint on the ends. The tile are twice as long as they are wide and each end is cut at a forty-five degree angle. Two colors are required for this design.

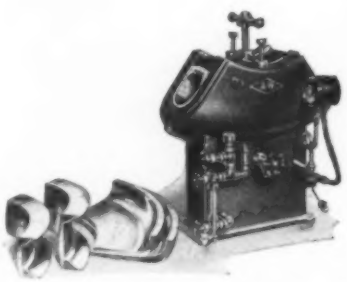
L is a plaid design similar to design *J*, having four small squares of a dark color in each corner, four oblong tiles of medium color, and one light left half tile and one dark left half tile in the center, one square alternating in checker-board fashion with one light right half tile and one dark right half tile in each square.

Where the tile is to be laid in units the space to be covered should not be smaller than approximately five hundred feet, as for example in waiting rooms, halls, and club rooms.

There are indeed many more designs of rubber tiling, in fact their name is legion. However, the twelve patterns here described and illustrated are good examples of the artistic and beautiful effects which may be obtained in rubber flooring.

ELECTRIC TIRE REPAIR VULCANIZER

A compact electric repair vulcanizer which will take most sizes of tires is here illustrated. The steam is generated in a self-contained steel boiler by means of electric heating elements. The steel boiler, thermostatic control and two additional safety devices, in the opinion of the manufacturer, remove this from the class of equipment which is causing vulcanizers much trouble with state boiler inspectors.



Williams' Tire Vulcanizer

This new outfit is furnished complete with extra shells and bead molds to properly cure all balloon sizes from 4.40 to 6.75 inclusive. The bead molds and reducing shells are furnished regularly in polished aluminum, but can be polished steel if desired. Additional bead molds can be provided to handle high pressure tires from 4½ to 6-inch inclusive in this same single cavity mold. The mold opening is of sufficient depth to take flat tread tires using extra flat tread inserts which have been designed especially for the outfit.—The Williams Foundry & Machine Co., Akron, Ohio.

Native Ceara Plantations in Africa

In an article on the future of African rubber, published in the *Revue Générale du Caoutchouc*, November, 1926, Auguste Chevalier tells, among other things, an interesting story of the renewed and apparently very successful efforts made in the last seven years to get the natives of the Oubangui-Chari district to take up the cultivation of Ceara (*Manihot Glaziovii*).

To begin at the beginning, the Ceara was introduced to these parts in 1902 when seeds from the Senegal were planted in the experiment garden of Krébedjé Fort Sibut. For years nothing more was done about rubber cultivation in this territory. But when about 1911 it was found that the areas of wild rubber plants were becoming exhausted, the authorities in 1912 decided to create plantations of Ceara in the vicinity of the villages and each native was supposed to have 75 trees at least by the end of three years. But the first plantings did not take place until 1916 when each native had to plant 25 seeds which were supplied to him. But up to 1918 results obtained were very poor. Then M. Lambin, who had become Governor of Oubangui-Chari in 1917, took a hand in the matter. In 1919, 1,700 kilos of seed were distributed among the natives and the same repeated during the following years, so that at present there are several million plants in this territory.

The natives apparently were equal to the occasion and developed a whole system of exploiting the trees and coagulating the latex, a proof that these people when properly handled can be taught to do things. The cultivation and the collection of the rubber is left to the children and young people.

Usually the seeds are sown broadcast in quantities, close together, for it was found that when planted in rows, the young trees were not able to resist the violent gusts of wind, but when placed close together, they not only withstood storms better, but could hold their own against harmful weeds, while finally the upkeep during the second year was rendered easier. Then thinning takes place, only robust looking trees being allowed to stand, the distance being about 3 to 4 meters.

The V-cut is used in tapping. All equipment is made by the natives and is of course limited to a very few articles. The tapping knife, a spout of baked clay, and a calabash in which to carry these articles to the factory come first. The factory is a shed in the plantation. Here are the small earthenware vessels of about 25 cm. long, 8 to 10 cm. wide and 3 to 4 cm. deep (about 10 by 4 by 1½ inches), for coagulating the latex, for which the following interesting process has been found. The vessels are first filled to half their height with water, then the latex is poured on so that it rises about 2-3 mm. after which the whole is allowed to rest.

The latex which first mingled with the water comes to the top like cream on milk. It then gradually coagulates, forming a cake, which after a few hours is of a consistency to permit it to be removed by hand. The water-soaked coagulum is kneaded by hand, rolled out into thin strips and washed. These strips, which are white, are dried on a cord slung under a shed where a little fire has been made. When dry, the crepe is a straw or brown color and is almost translucent.

The quantity of Ceara rubber harvested in 1925 was about 200 tons and it is hoped that for 1926 the amount will be 300 to 400 tons. The price obtained is 12 to 15 francs per kilo, which is 15 to 20 per cent more than that obtained by rubber from lianas.

The chief importance of this work, M. Chevalier explains, lies in the fact that hereby the native is freed from the hazardous and arduous task formerly imposed on him when he was forced to collect wild rubber in the jungles removed several days' journey from his village.

THE VALUE IN 1926 OF AMERICAN CHICLE IMPORTS WAS $6,204,000, a gain of 3.6 per cent over 1925.

Thickness Measurements of Compressible Materials

Roy W. Brown

Engineering Laboratories, Firestone Tire & Rubber Co., Akron, Ohio

IN the modern machine shop, measurements are made and parts finished so accurately that errors are quite commonly reduced to less than one one-thousandth part of an inch. This accuracy has been attained by the development and use of such instruments as micrometers, dial gages, optical gages, limit and Johansson gages.

Unfortunately the application of these instruments to the measurement of such materials as fabric and rubber, or the combination of the two, does not produce the same accurate results. The true dimensions of a compressible material cannot be obtained by the means used in commercial mechanical micrometers or thickness gages. Positive pressure must be exerted on the material by the instrument to insure its proper operation, which pressure compresses the material, thereby changing its original dimensions. Since the reading given by such instruments is a function of the compressibility of the material to be measured, as well as its thickness, it is apparent that to secure commercially accurate thickness measurements the pressure exerted on the material by the instrument must be first reduced to a minimum, and then controlled and standardized.

The influence of micrometer foot pressure upon the indicated thickness of some typical materials is shown in Figure 1. The indicated thickness decreases as the foot pressure increases, the amount varying with the material and its condition.

Examination of the mechanism used in typical dial micrometers, Figure 2, shows the foot pressure results from the force of the springs *A*. These springs are installed to minimize the error caused by lost motion and friction in the mechanism.

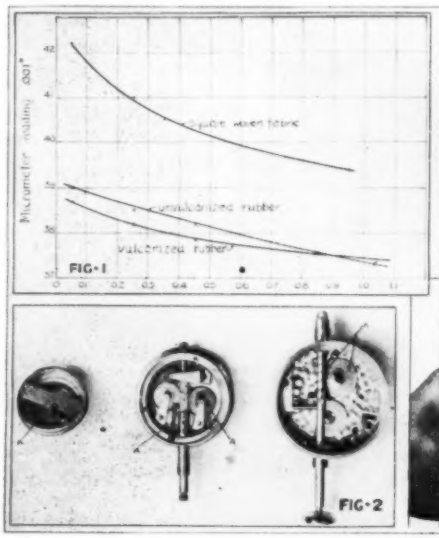
Careful determination of the actual pressures caused by these springs in some fifty dial micrometers of a generally-used make, shows the variation in pressure ranged from .300 pounds to .800 pounds, notwithstanding the manufacturers' claims that the springs were standardized.

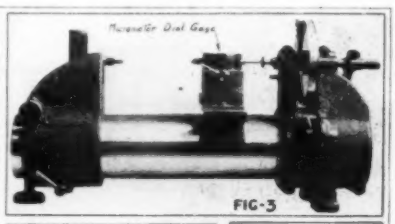
In addition to the variable caused by the springs, friction in the spindle and gear train may appreciably increase or decrease the foot pressure, depending upon the direction of motion immediately preceding the taking of the micrometer dial reading. The amount of friction present in the mechanism depends, of course, upon numerous variables such as its age, the amount and quality of oil used, cleanliness, temperature, and numerous other details. It is evident that to secure reasonably accurate measurements with dial micrometers on compressible material the foot pressure must be kept constant, say within plus or minus 10 per cent of its predetermined value. This immediately limits the maximum permissible friction to within 10 per cent of the foot pressure.

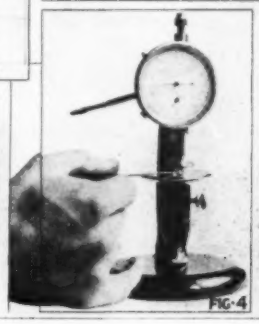
To determine the allowable minimum foot pressure, as limited by friction, a large number of dial micrometers in regular service was examined. It was found that the majority of these required a force of .04 pounds or less to start movement in the mechanism when the mechanism is shielded from exterior vibrations. This indicates that for commercial usage the foot pressure should not be less than .4 pounds.

The size of the foot in contact with the material also affects the amount of compression resulting from the pressure imposed by the micrometer foot. In general it is desirable to secure as low unit area pressure on the material as possible. However, in practice such factors as the ability to maintain parallel the micrometer feet, and the effect of small isolated high spots in the material limit the size of the micrometer foot. Experience indicates that a ¾-inch diameter circular foot is probably the most satisfactory for measuring the thickness of fabrics, rubberized fabrics, and rubber stocks.

It is seen that the friction occurring in commercially available instruments limits the minimum foot pressure, and that other considerations determine approximately the size of the micrometer feet. Hence, it appears logical to use a nominal unit area pressure of one pound per square inch. For fabric and rubber stocks, this pressure may be conveniently obtained with a circular micrometer foot ¾-inch in diameter and a pressure of .44 pounds. This practice has been in extensive use and has produced very gratifying results.







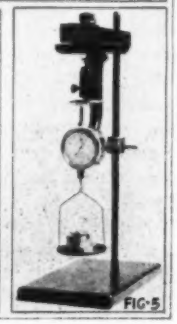


Fig. 1. Errors in Thickness Measurement Caused by Vibration in Micrometer Foot Pressure

Fig. 2. Typical Dial Micrometer Mechanisms

Fig. 3. Calibration of Dial Micrometers

Fig. 4. Method of Determining Parallelism of Micrometer Feet

Fig. 5. Determination of Foot Pressure

Investigations to date indicate that dial micrometers, designed to accurately measure the thickness of compressible material, must have the following essentials: (1) Absolute accuracy of linear measurement to within plus or minus .0005-inch; (2) that the foot be of a definite and predetermined area and that it be maintained parallel to the opposite foot to within plus or minus .0005-inch; (3) that the load on the foot be maintained to a definite and predetermined amount. Variations in the load on the foot from all causes, including friction in the gage mechanism, must be kept to within plus or minus 10 per cent of the initial value.

As mentioned above, a load of one pound per square inch of foot area has been found to give accurate thicknesses of fabrics and rubber stocks. If the unit area pressure is kept constant, the foot area may be varied within reasonable limits without affecting the accuracy of the dial micrometer measurements.

In the determination of the performance of dial micrometers, some special equipment is required. Linear accuracy may be determined by the use of specially constructed Johansson gage blocks, or a high-precision micrometer, as shown in Figure 3. A bench micrometer accurate to plus or minus .0002-inch is provided with fixtures for mounting the dial micrometer heads, enabling rapid determination of linear accuracy over the entire range.

The foot area may be easily determined by direct measurement. For determining the parallelism of the two feet, a ball bearing is inserted in a hole in a small strip of brass and moved about between the micrometer feet, as shown in Figure 4. Movement of the dial pointer then indicates deviation from a true plane or lack of parallelism of the micrometer feet.

A convenient means of determining the foot pressure consists of mounting the gage in an inverted position on a bracket, as shown in Figure 5, and weighing directly the spring pressure exerted on the micrometer foot. The amount of friction may be determined by carefully adding small weights, one at a time, until the first noticeable movement occurs. The amount of weight which can be removed before noticeable movement in the opposite direction begins, is a direct indication of the friction present in the gage mechanism.

In some instances dead weight has been used to replace springs as a means of securing the desired foot pressure. For stationary bench use weights are an improvement, but for portable or semi-portable use the advantages are overcome by the objection to additional overall size and weight, to the necessity of maintaining the gage in a vertical position, and to the greater probability of derangement of the mechanism. Some dial micrometers, especially ones with ranges longer than ¼-inch and pocket type instruments, have springs so short that the foot pressure varies greatly for different readings. Obviously accurate thicknesses of fabric and rubber materials cannot be secured with such instruments.

It is believed that an appreciable increase in the accuracy of measuring compressible materials will be realized with the more general recognition of the effect on such measurements of the factors discussed, i.e., linear accuracy, foot size, foot pressure, and parallelism of feet. Standardization of these factors would eliminate the confusion existing at present and would result in a distinct economic gain.

AUTOMOTIVE SHIPMENTS AID RAILROADS

During a meeting on May 10 of the traffic managers' division of the National Automobile Chamber of Commerce, announcement was made that in 1926 the total automotive freight shipped on the railroads of the United States amounted to 3,280,000 carloads, as compared with a grand total for the year of shipments of all classes of goods at 53,309,644 carloads. In more detail the figures for tires included 55,000 carloads, with crude rubber shipments at 15,600 carloads.

AMERICAN EXPORTS OF RUBBER SOLES AND HEELS DURING THE year 1926 totaled 4,277,301 pounds, value $1,363,489. Shipments of canvas rubber-soled shoes were estimated at 5,469,004 pairs, value $3,968,566.

TIRE INVENTORY — PRODUCTION — DOMESTIC SHIPMENTS

Both production and shipments of all types of automobile tires and inner tubes were larger in April than in March, according to Rubber Association records, the only exceptions being the figures for shipments of balloon casings and solid and cushion tires. All these estimates also represented a considerable gain over the corresponding ones for April, 1926. Inventories, however, of both casings and inner tubes have continued to steadily increase during 1927, with the single exception of solid and cushion tires.

Production and shipments of all types of pneumatic casings reached totals for April of 4,724,748 and 4,276,464 respectively, as against the corresponding figures for the month preceding of 4,707,672 and 4,276,107. April figures for production and shipments of all types of inner tubes were 5,529,936 and 4,769,385 respectively, as against the totals for March of 5,388,312 and 4,618,365. April production of solid and cushion tires rose to 62,126, as against 54,691 for March, while shipments for April and March were 57,716 and 59,706 respectively.

Consumption of cotton fabric in the manufacture of casings and inner tubes was estimated for April at 17,237,557 pounds, the following being the totals for consumption during the past three years: (1924) 142,415,356 pounds; (1925) 168,295,927 pounds; and (1926) 165,963,182 pounds. The April consumption of crude rubber for the products just mentioned was 51,333,262 pounds, other totals being: (1924) 453,845,546 pounds; (1925) 552,389,272 pounds; and (1926) 518,043,062 pounds.

	April, 1927		
	Inventory*	Production	Total Shipments
Pneumatic casings—a'l types	9,091,787	4,724,748	4,276,464
Inner tubes—all types	13,351,406	5,529,936	4,769,385
Balloon casings	3,794,709	2,741,841	2,417,926
Balloon inner tubes	5,302,394	3,131,335	2,492,473
High pressure cord casings	4,674,295	1,923,402	1,773,314
High pressure inner tubes	8,049,012	2,398,601	2,276,912
Solid and cushion tires	159,484	62,126	57,716

COTTON AND CRUDE RUBBER CONSUMPTION IN TIRES AND TUBES

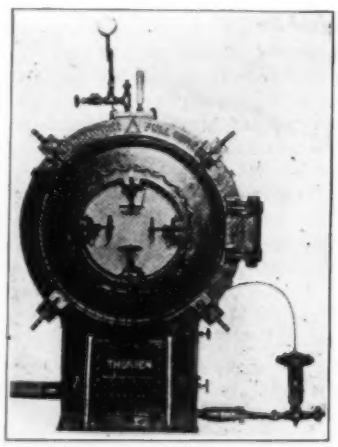
	Pounds
Cotton fabric	17,237,557
Crude rubber	51,333,262

*As of April 30, 1927.

Rubber Association figures representing 75 per cent of the industry.

FULL CURE RETREADING MOLD

The complete retreading of a pneumatic tire is commonly done in a sectional mold which requires a number of shifts to complete the vulcanization around the circle of the tire with as many overlapped cured spots. The full cure watch-case retreading mold here illustrated vulcanizes the retread entire at a single operation under an even heat. Other advantages secured by this mold are that the tire is cured at an equal pressure at all points due to the use of a full circle airbag or inner tube. The construction of the mold is such that the tire bead cannot be overcured. The effectiveness of this apparatus has been thoroughly tested in service and demonstrated to be a time and labor saver. The vulcanizer requires no attention while the tire is in the mold and will cure any size of tire.—Service Vulcanizing Works, 540 Van Ness avenue, San Francisco, California.



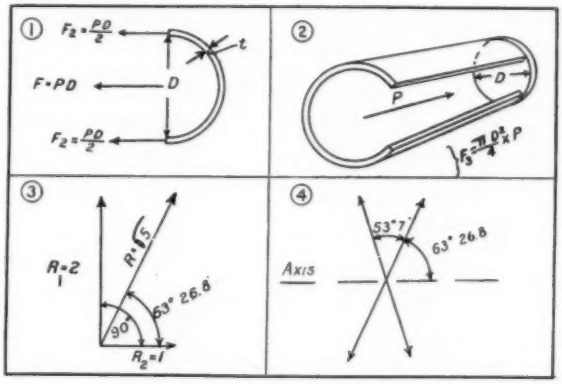
Perfection Full Cure Mold

Braided *Versus* Wrapped Hose

A Brief Survey of the Basic Principles Underlying the Construction of Hose Designed to Withstand Internal Pressure

Andrew D. Maclachlan
Mechanical Development Department, The B. F. Goodrich Rubber Co., Akron, Ohio

THE recent general application of the lead press method for curing braided rubber hose, with attendant lowering of manufacturing costs, again raises the question as to whether braided or wrapped hose is the better type of hose construction. Aside from any consideration as to increased flexibility in the cured hose or exterior formation of ridges, etc., to prolong cover life, braided hose presents an added constructional advantage in that the lay or angle of the component yarns may be controlled almost without limit. In order to make a hose capable of realizing as nearly as possible these advantages presented, it is essential that constructions be figured on an accurate basis. True, the rule of thumb method of using one size of braider and altering the angle of lay, so as to get the desired covering effect of the yarn, will enable the processing of hose not subjected to relatively high working pressures. This method may also be used where the physical characteristics of the hose under pressure are not of prime importance. Garden hose, braided tubing, etc., fall in this class, although even here more attention on the part of manufacturers to construction often leads to reductions in expansions and subsequently longer life of the rubber parts, i. e. tube and cover, by lessening the tendency toward cracking.



Diagrams of Forces

In the case of braided hose where the length, diameter or volume changes are of importance such as in pneumatic hose, pressure lubricating hose, etc., the rule of thumb will not apply. The conditions often required of hose in such particular service are such as to entirely preclude the use of the one size braider and any angle method. In order to approach these items as well as to improve the service rendered by hose under less particular service conditions, attention must be paid to the stresses encountered.

Consideration of Limits

The stresses set up in a length of hose by the internal pressure conditions are similar to those in cylindrical pressure vessels, such as pipes, boilers, etc. In order to avoid complication, only the case where the walls are relatively thin or more accurately the ratio of wall thickness to internal diameter is small and similarly the ratio of length to internal diameter is small, will be considered. The addition of the qualifying features of non-uniform distribution of stresses existing in thick walled vessels is not necessary in a consideration of fabric applications and comparisons.

Stresses Due to Pressure

Let the internal force set up by the pressure acting to effect burst in longitudinal direction be equal to F. This force will then act radially against the inside diameter and for any unit length may be expressed as $F = PD$. Where P equals the internal pressure and D the internal diameter, then the force on any cross section of unit length acting to effect longitudinal burst may be expressed.

$$F_1=\frac{PD}{2}$$ Equation 1, See Figure 1.

Assuming the tensile stress (T) of the material resisting this force to be uniform and the cross section of uniform thickness (t), then with total resistance to stress of R_1 we have:

$$R_1=\frac{PD}{2}=Tt.$$ Equation 2.

Again let the internal force set up by the pressure acting to effect burst diametrically be equal to F_3. This force may be considered as acting on the closed end of the cylinder or

$$F_3=\frac{\pi D^2}{4}\times P$$ Equation 3, Figure 2

With the same assumption as to uniformity as before, we have:

$$\frac{\pi D^2}{4}\times P=\pi DTt \text{ or}$$

$$R_2=\frac{PD}{4}=Tt$$ Equation 4

Comparing Equation 2 and 3 shows that both F_2 and F_3 vary directly as the internal pressure and diameter. It then follows that the cylinder is capable of resisting double the stress diametrically as it is longitudinally. Thus, seamless tubing subjected to internal pressure invariably splits lengthwise.

While the two stresses considered are those set up by the pressure, they are simultaneously applied in the same plane and may be combined into one resultant (R). This resultant stress would then be the maximum stress to which the material is subjected.

It has been shown that R equals $2R_2$ and that they act at right angles to each other in the same plane. Thus

$$R=\sqrt{R_1^2+R_2^2}$$ or substituting $R_1=2$ and $R_2=1$

$$R=\sqrt{5}$$

and makes an angle whose tangent is 2 or 63° 26.7′. See Figure 3.

Since these two stresses may be considered in two directions in one plane, two resultants are derived, making vertical angles with each other of 53° 7′ and an angle of 63° 26.7′ with the horizontal axis of the cylinder. See Figure 4. Expressing R in terms of the relative values of the stresses as shown in Figure 3, we have:

R_1: $R=2:\sqrt{5}$ substituting and solving $R=.559$ PD

This then represents the magnitude and direction of the resultant stress set up in the hose under pressure. If it were then possible to lay and maintain the individual fibers or cords of a hose so that this force acted on their longitudinal axis, the distortion of the hose due to pressure would be restricted to that caused by the stretching of the material. In this case then the hose would be as liable to failure through splitting lengthwise as to parting on a cross section or vice-versa.

Conclusions

In the case of wrapped hose where square woven fabric is used, it is manifestly impossible to so lay both the warp and filler so that the resultant stress falls on their respective longitudinal axis. It, therefore, follows that with hose built of 90° fabric cut at 45°

bias, a shearing effect is imparted as the warp and filler attempt to approach the resultant angle.

The behavior of wrapped hose of 45° bias under pressure bears this out in that a contraction in length and expansion in diameter is always observed. Accompanying this is an angular movement or twist due to the same cause.

In braided hose constructed with due consideration for these stresses, any shearing effect on the yarn is slight. The application of internal pressure to the hose, therefore, causes much less expansion while twist is practically eliminated.

For these reasons, if no other, the braided type of construction is superior to the wrapped.

Used Rubber Machinery

Heavy equipment came in with large tire production and has an ever increasing demand. A few of the older plants still have some of their original small machines. Perhaps sentiment keeps them from the second-hand dealer. Small mills, however, are useful where light batching is necessary, or a variety of colored stocks are mixed. Very little rubber equipment is scrapped, old or narrow calenders may be altered to do special work, and likewise tubers, presses, etc.

The dealer in second-hand rubber machinery generally specializes but may also supply motors, chain drives and reduction gearing for mills and calenders. It is hardly possible for him to get together a complete assortment, but by keeping in close touch with the rubber factories and knowing what they are likely to discard, a demand for a particular machine or piece of equipment may be quickly supplied. Manufacturers having a machine or two to dispose of will usually allow the dealer and his prospective customer to see it in operation.

Buyers of used rubber machinery are various. They may be firms starting on a single article or line. Occasionally the smaller items are purchased to be sent abroad, as they answer well enough where labor cost is low and not much output expected. Concerns increasing production will be interested in the largest equipment and some of the wealthiest of these buy second-hand machinery if it is in first class condition and the price is right.

The second-hand dealer will have inquiries for about everything used in the factories, often the builder of the machine and always the size and other details are specified. In geared machines, beside 2-roll, grooved and plain, from 24 to 60 inches there will be 3-roll calenders, from 40 to 72 inches and occasionally 2- and 4-roll inclosed washers and mixers, rubber cutters, vacuum driers, pumps and condensers, tubers and strainers from 3 to 12 inch worm, belt or motor driven; fabric driers, plate or drum type and exhaust fans; single or double end spreaders with steam table or drum, and doubling, looping, embossing and varnishing machines; horizontal and vertical churns, dough mills and strainers; steam jacketed kettles, and double shell vulcanizers.

In presses, every size from 12 by 12 inches to 32 feet by 5 feet with various ram diameters and a number of plates, pumps and accumulators; horizontal vulcanizers in many sizes and tire vulcanizers; belt and hose making machinery, lead presses and strippers; bias and straight fabric cutters.

In small equipment: tube skivers and joint vulcanizers, tire molds and tube poles, various designs of stock cutting machines and trimmers, electric and pneumatic hoists, experimental mills, calenders, etc.

A dealer has to keep well informed in many directions and be posted on the original cost of the various machines and what to allow for depreciation on account of age or wear. He must know the importance to buyers of the slight differences in construction between various makes, also what is modern or can be described as fairly so. He should know the cost of dismantling, freight and cartage and renovation of machines that are worth spending money on. It may pay to recut washer rolls, reline boxes, and provide new guides and screws for mills, or a new sleeve or worm for a tuber.

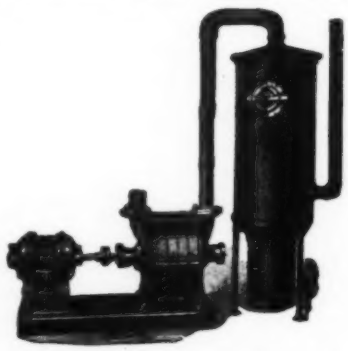
The condition of used machines is quite easy to determine, except perhaps the stock running ones. All parts of a mill are in plain view or easily gotten at. The size of bore or chambering of all rolls is of importance to know. The capacity and accuracy of a second-hand calender, tuber or refiner cannot be exactly known until in operation. It is an expensive job to put an old or worn calender in good order, as after new box lining and gears the rolls may have to be reground. The cylinder lining and screw of a tuber if worn reduce the capacity of the machine, and a refiner will not do good work if rolls and boxes are worn.

Present inquiries are for mills 50-inch and upward, larger back roll two-piece guides and oil cups; calenders over 60 inch with motor roll-adjustment; refiners with large delivery roll and high friction; boltless vulcanizers; steel platen presses with large ram diameter.

While on the subject of rubber equipment it may be said that although prices are from three to four times higher than twelve years ago, they are not excessive when high labor cost is considered, and the improved construction of many machines which enables larger output, favorable operating cost and minimum repair charges.

STATIONARY VACUUM CLEANING SYSTEM

The dusty condition that prevails in certain departments of rubber factories where powdered materials are handled causes much discomfort to workmen and damage to stock. The system illustrated is known as Tabco Pneumatic Sweeping System and is installed in several of the large rubber manufacturing plants for the removal and collection of dry materials in the compounding room. These dry materials, in the form of "dust," constitute a problem of considerable magnitude in rubber plants, and the pneumatic system, either portable or stationary, accomplishes the important function of removing, conveying and collecting the dust in one operation.



Tabco Pneumatic Cleaning System

In the arrangement shown a power air pump is connected to a large vacuum chamber and the system is piped to any point from which dust is to be withdrawn. At these various stations vacuum hose is connected and fine litter, fiber and dust are drawn into the receiver at the central station where they can later be removed for final disposition.—Allen & Billmyre Co., Inc., Grand Central Palace, New York, N. Y.

BRITISH TIRE EXPORTS

Exports of automobile casings from the United Kingdom during the first quarter of the present year have risen to 283,124 from a total number for the first quarter of 1926 of 191,095. The leading markets for the 1927 period were: British India, 85,095 casings; British South Africa, 73,754; Australia, 70,130; Argentina, 42,563; British Malaya, 37,806; Irish Free State, 37,141; New Zealand, 37,038; Denmark and Faroe Islands, 29,873; and Brazil, 28,197.

UNITED STATES EXPORTS OF AUTOMOBILE TIRES DURING THE FIRST quarter of 1927 reached a total value of $9,150,000, a gain of 20.5 per cent over the figure for the corresponding quarter of 1926, or $7,593,000. A quantity comparison shows an advance of 64.8 per cent for tires and 24.4 per cent for inner tubes.

Temperature Control of Mill and Calender Rolls[1]

Practical System for the Economical Handling of Cooling Water

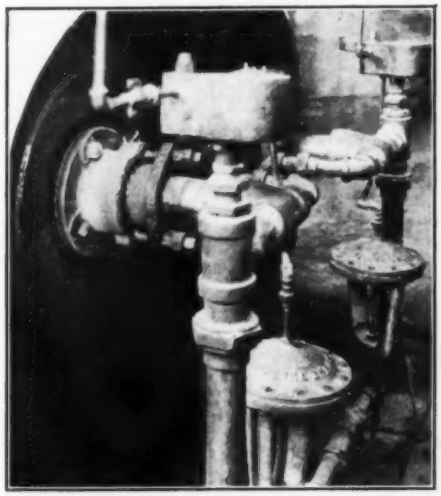


Fig. 1. Controller System Applied to a Rubber Mill

THE control of the temperature of mill and calender rolls has until recently been a matter for hand regulation and consequently irregular and unsatisfactory. All rubber factories have an ample supply of cold water, more or less, which should be conserved by using it economically.

Automatic Control

Manual control of the flow of cooling water on a mill line always results in steady waste, because the valves are generally left wide open.

Tests of the economy of the system of control herein described indicate that it reduces the consumption of water practically two-thirds. The amount of saving depends on the temperature of the water at the inlet end of the system. The colder the supply at that point, the greater the saving. Safeguarding the waste of water greatly lessens the cost of purchased water, lowers pumping cost and even may obviate the necessity of installing increased pumping equipment.

If the temperature of the supply is too high any control system evidently would be useless, since in such case the mill-roll surface temperature will be too high, even with the supply valve fully opened. Most mill men consider that the surface of mill rolls does not respond quickly enough to the change in temperature of the water within the roll. As a matter of fact, investigation shows that the surface of a mill roll is very quickly affected by changes in temperature of the cooling water. One need but regulate the temperature of the cooling water at the exit from the rolls to hold their surface heat constant at any degree desired.

The first automatic control system developed and applied to a rubber mill is pictured in Figure 1. In this view the compressed air line connections are shown entering the casings of the control instruments. The latter are mounted in the outlet pipes from the mill at the point where these descend. On top of each instrument may be seen the indicator for setting the temperature of the waste water. Between the outlet pipes are located two air motor valves with pipe connections to the respective controllers that operate them.

There is a divergence of opinion regarding milling temperatures but, whatever the preferred one, it can in no way affect the scheme of control by these instruments. They will maintain the temperature of the water flowing from mill or calender rolls at any degree desired above its initial temperature. The controller and the diaphragm motor valve are simple and durable, and like many others used in rubber plants are air actuated. The standard operating pressure is 15 pounds, although any stable pressure may be used between 15 and 25 pounds.

Expansion Type Controller

The expansion stem type controller is employed because it is the simplest and most rugged and will stand hard usage. Furthermore, of all types, it performs best at the low temperatures required. It has no part that can ever fail by wear or service, and it costs the least of any controller. A sectional view of this instrument, in Figure 2, shows it to consist of a box portion *A* from the back of which a non-expanding tube *B* extends. Within

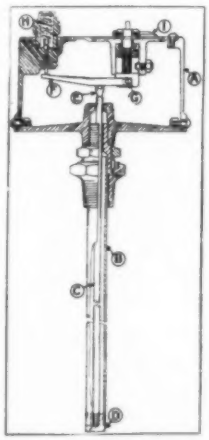


Fig. 2. Controller

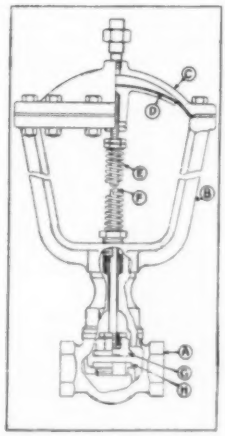


Fig. 3. Motor Valve

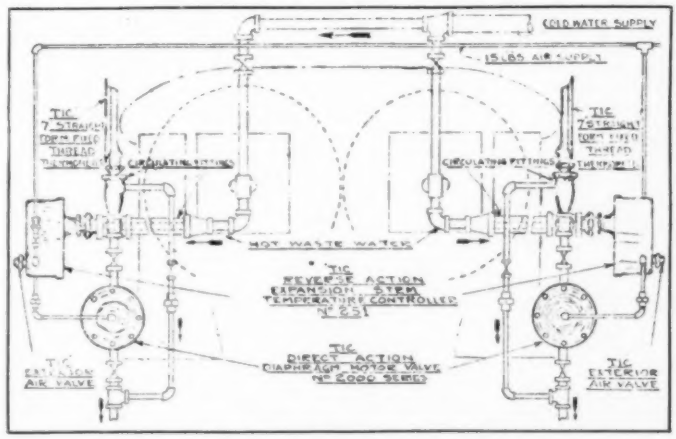


Fig. 4. Cooling System for Two-Roll Mill

[1] Thermo Instrument Co., Akron, Ohio.

this is an expanding tube *C* attached solidly to *B* at the extreme end *D*. At its opposite end the expanding tube *B* touches a contact point *E* on a lever *F*, located within the casing *A*. The lever is pivoted in the rear of the setting device at *G*. At its opposite end the lever presses against the stem of the exterior air valve *H*.

This exterior construction is a feature of much importance because it permits removal of the air valve without the necessity for breaking connections, or opening the casing of the instrument. On the outside of the casing is also situated the dial and index of the indicator *I* for setting the instrument to control at the desired temperature.

Diaphragm Motor Valve

The motor valve is air operated and of the familiar diaphragm pattern. As seen in the Figure 3, its parts are as follows: A globe valve *A* is surmounted by a yoke *B* supporting an air dome *C* sealed with a rubber diaphragm *D*. The latter when inflated by air pressure operates against the spring *E* on the valve stem *F* to close more or less the valve *G* upon its seat *H*.

The combination of controller and motor valve functions as follows: The outer tube *B* of the stem expands when heated, carrying the inner non-expanding tube *C* with it and when the setting point *I* of the controller is attained, closes the air valve *H* and cuts off compressed air to the diaphragm of the motor valve, and the air exhausting from the diaphragm through an air leak provided for the purpose, permits the motor valve to open and discharge the heated water.

When the temperature falls below the setting point of the controller the stem *C* contracts, opens the air valve *H* admitting air to the diaphragm *D* of the motor valve, inflating it, and closing the motor valve, thus stopping the flow of water. The controller is instantly responsive to the slightest temperature change of the water, hence will control the temperature of the discharge or waste water within very close limits.

The self-explanatory diagram, Figure 4, shows the arrangement of two units as piped for regulating independently the waste water temperature for both rolls of an ordinary rubber mill. A similar arrangement can be applied to a calender or to cooling a tubing machine. The practical value and efficiency of this controller is demonstrated daily in some of the leading rubber factories. Its installation inevitably reduces millroom operating expense and renders possible the standardization of milling and calendering heats and consequently better work.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C. The publications which give details of the rubber industry in some one country are marked with an asterisk.

Number	Special Circular
*1505	"French Rubber Footwear Exports During March and First Quarter of 1927."
*1506	"French Tire Exports During First Quarter of 1927."
1508	"Tire Exporters' Weekly News Letter."
1509	"Rubber Footwear Exporters' Monthly News Letter."
1510	"Crude Rubber News Letter."
1512	"Comparative Exports of Rubber Boots and Shoes From United States, Canada, and United Kingdom During First Quarter of 1927."
*1513	"Michelin Plant at Stoke-on-Trent, England."
*1514	"Danish Rubber Footwear Production and Trade."
1515	"Tire Exporters' Weekly News Letter."
*1517	"April Imports of Golf Balls Into United States."
*1520	"Crude Rubber Re-Exports From United States; Month of April, 1927."
1521	"Comparative Tire Exports From United States, Canada, United Kingdom, and France During First Three Months of 1927."
*1522	"Application of New Tire Duties in Great Britain."
1524	"Mechanical Rubber Goods Exporters' Monthly News Letter."
1525	"Tire Exporters' Weekly News Letter."
1526	"Crude Rubber News Letter."
*1528	"Canadian Tire Exports During April, 1927."
*1529	"British Exports of Rubber Footwear During April, 1927."
*1530	"British Exports of Automobile Casings During April, 1927."
1531	"Crude Rubber News Letter."
1532	"Tire Exporters' Weekly News Letter."
*1534	"Preliminary Statistics of United States Crude Rubber Imports, May, 1927."
*1535	"French Rubber Footwear Exports During Month of April, 1927."
*1536	"French Tire Exports During Month of April, 1927."
1537	"Tire Exporters' Weekly News Letter."
1539	"Rubber Footwear Exporters' Monthly News Letter."

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished those who read them. The Editor is therefore glad to have those interested communicate with him.

Number	Inquiry
957	Manufacturers of leather soled rubber boots.
958	Gasket manufacturers.
959	Makers of rubber suction cups.
960	Manufacturers of long rubber boots.
961	Inflated rubber balls for swimming pool, 36 inches in diameter.
962	Tire splitter.
963	Firms manufacturing hard rubber goods.
964	Manufacturers of reclaiming machinery.
965	Machine to strip fabric from cord tires.
966	Instrument for measuring surface heats on rubber rolls.
967	Material for encasing flexible metallic hose.
968	Manufacturers of rubber gloves.
969	Makers of lift trucks.
970	Rubber frog molds.

Foreign Trade Information

For further information concerning the inquiries listed below, address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Country and Commodity	Purchase or Agency
25,587	Egypt. Rubber bands and erasers	Agency
25,589	Poland. Tires, straightside and cord, 3,000 per annum	Purchase
25,590	Australia. Rubber stamp material	Agency
25,591	Netherlands. Hose, corrugated and plain, ½, ⅝, ¾, and 1 inch in diameter	Agency
25,605	Brazil. Fire hose	Purchase and Agency
25,642	Egypt. Rubber heels	Agency
25,647	Denmark. Rubber shoes and overshoes	Agency
25,651	Cuba. Automobile tires and tubes	Agency
25,705	Chile. Tennis shoes	Purchase
25,717	England. Rubber sea boots	Purchase
25,718	England. Rubber boots and shoes	Purchase and Agency
25,719	Chile. Druggists' rubber sundries	Purchase
25,760	Cuba. Rubber goods, including sporting goods and toys	Purchase and Agency
25,761	France. Rubber goods	Purchase or Agency
25,767	Chile. Automobile tires	Agency
25,789	Chile (Santiago). Rubber goods, complete lines	Agency
25,790	Chile (Antofagasta). Rubber goods, complete lines	Agency
25,835	Germany. Rubber bags, pouches, etc.	Purchase or Agency
25,858	Netherlands. Garden hose	Purchase and Agency
26,003	Italy. White adhesive rubber, for tape repair	Purchase
26,004	Germany. Aprons and clothing, especially waterproof coats	Agency
26,005	Germany. Rubber goods, and druggists' rubber sundries	Agency

HOLLAND'S RUBBER INDUSTRY

The number of rubber factories operating in Holland has diminished since the war. The following figures issued by the Central Statistics Bureau at the Hague shows production has been increasing during the past few years.

	1921	1922	1923	1924	1925
Number of manufacturers	15	15	14	13	12
Consumption (in metric tons) of raw rubber	647	774	832	894	828
Consumption (in metric tons) of waste and reclaimed rubber	206	224	208	380	881
Value in (florins 1,000) of materials	3,450	2,930	3,080	3,170	4,220
Value of output (in florins 1,000)	6,920	5,940	5,820	6,490	7,940
Employes at Sept. 15	1,550	1,220	1,510	1,430	1,690
Primary engine power on Dec. 31	6,140	6,000	5,950	5,330	5,510

Considering its population, Holland is the largest user of bicycles and bicycle tires in the world, and statistics are now available for the first time concerning the local production of inner tubes and casings for bicycles. Casings produced totaled in 1925, 2,144,000, as compared with 1,048,000 in 1921 and 1,711,000 in 1919. For inner tubes the figures were 704,000, 465,000 and 777,000 respectively.

American Rubber Technologists

BENTON DALES, chem. *b.* Dec. 11, 1877, Lincoln, Neb., B.Sc., 1897, M.A. 1899, U. of Neb.; Ph.D. Cornell U. 1901; asst. prof. chem. U. of Neb., 1903, prof. 1906; head chem. dept. 1908; research chem., B. F. Goodrich Co., 1918; mgr. chem. labs. 1922-1925; research chem. since 1925; professional work, teaching, research in analytical chem., rare earths, rubber and colloids; patents on water inks, golf ball covers, mandrel lubricants and rubber. *Member:* Amer. Chem. Soc., Amer. Asso. for Adv. of Science, Akron Torch Club, Franklin Club of Akron, Alpha Chi Sigma, Phi Beta Kappa, and Sigma Xi. *Address:* P. O. Box 11, Fairlawn, O.

Jerome L. Boyer, chem. engr. *b.* June 4, 1899, Reading, Pa.; B.S., M. I. T., 1922; control dept. Hollingsworth & Vose Paper Co., 1922-1923; chem. dept., Reading R. R., 1924; chem. dept., Simplex Wire & Cable Co., since 1925. *Member:* Amer. Chem. Soc., Alpha Chi Sigma. *Address:* 66 Sidney street, Cambridge, Mass.

Ralph Russell Evans, chem. *b.* Apr. 12, 1899, Newburyport, Mass.; B.S., M. I. T., 1921; chemist with Simplex Wire & Cable Co. since 1922. *Member:* Amer. Chem. Soc. *Address:* 66 Sidney street, Cambridge, Mass.

Carl Frances Ogren, engr. *b.* June 22, 1894, Jamestown, N. Y.; M. E. Cornell U. 1917; inspection gun fire control instruments, U. S. Navy 1917-1919; also ensign engineer U. S. S. *Sablo;* research and production aluminum bronzes, Amer. Bronze Corp., New York, N. Y., 1919-1920; industrial efficiency engineering and production problems Manhattan Electrical Supply Co., Jersey City, N. J., 1920-1921. *Author:* Several patents on construction of flexible joint disks and methods of producing clutch facings. *Member:* Amer. Chem. Soc., S. A. E., Trenton Chapter, Amer. Business Clubs. *Address:* 20 Columbia avenue, Trenton, N. J.

J. Carleton Wood, chem. *b.* July 6, 1887, Marlboro, Mass.; Haverhill High School, Haverhill, Mass., 1906; graduated at Lowell Textile School, Lowell, Mass., 1909, in chem. and dyeing; Mount Hope Finishing Co., N. Dighton, Mass., 1909-1910; New York Bleachery Co., New York Mills, N. Y., 1910-1911; cement and fabric dept., Goodyear T. & R. Co., Akron, O., 1911-1914; fabric dept., Republic Rubber Co., Youngstown, O., 1914-1917; chem. Brunswick, Balke Collender Co., Muskegon, Mich., 1917-1923; sales dept., Atlantic Dyestuff Co., Portsmouth, N. H., 1923-1924; since 1924, sales dept., R. T. Vanderbilt Co., New York, N. Y. *Member:* Mason. *Address:* 111 N. Fourth street, Cuyahoga Falls, O.

Harold Gray, chem. *b.* Oct. 30, 1894, Carlyle, Ill. U. of Ind. 1912-1915. A.B. in chem. 1922; analytic and reseach chem., 1916-1919, Eli Lilly & Co., Indianapolis, Ind.; research chem. since 1919, The B. F. Goodrich Co., Akron, O. *Author:* Papers and patents on org. synthesis, accelerators, age resisters, hard rubber, rubber analysis, and rubber derivatives. *Member:* Phi Chi, Alpha Chi Sigma, Delta Upsilon, Am. Chem. Soc. *Address:* 281 Volga Way, Akron, O.

Paul Stevenson Shoaff, chem. *b.* July 25, 1893, Baltimore, Md.; Los Angeles High School; B.A. Indus. Chem. U. of So. Calif. 1913; chem. and supt. Pacific Products Co.; chem. and supt. Oceanic Eng. Corp.; supt. chem. plant, U. S. Govt.; chem. engr. and mgr. chem. eng. div. Goodyear T. & R. Co., Akron, O., and Los Angeles, Calif. 1922.—*Author:* "Internal Mixers for Rubber Stocks." *Member:* Amer. Chem. Soc., Akron University Club, Mason. *Address:* 792 W. Market street, Akron, O.

Burgess Darrow, engr. *b.* 1888, Boston, Mass.; S.B. in elec. eng., M.I.T. 1911; Development Dept. Goodyear T. & R. Co., 1911-1914; Racine Rubber Co., 1914; Hendrie Rubber Co., Los Angeles, 1915; Goodyear T. & R. Co., Akron, O. Since 1915 as follows: Tire Design Dept., 1915-1920; mgr. Tech. Service Dept., 1920-1921; development mgr. since 1921. *Member:* S.A.E., Akron Univ. Club, Fairlawn Heights Golf Club, Mason. *Address:* 880 Hereford Drive, Akron, O.

Robert C. Salisbury, eng. *b.* Nov. 11, 1891, Chicago, Ill.; John Marshall High, Kent Prep., and Lewis Institute, all in Chicago; asst. supervisor labor and safety, Illinois Steel Co., Joliet, Ill., 1911-1914; safety inspector, Amer. Car & F. Co., St. Louis, Mo., 1915-1917; Amer. Expeditionary Force, 1917-1919; mgr. safety and relief dept., Interstate Iron & Steel Co., Chicago, Ill., 1919-1921; organizer and mgr. Accident Prevention Dept., National Employes' Mutual Insurance Co., London, Eng., 1922-1923; mgr. health and safety dept., western plant Fisk Rubber Co., since 1923. *Author:* Papers on safe practice presented to Natl. Safety Council congresses. *Member:* Natl. Safety Council, Wis. Indus. Commission Advisory Code committee, Amer. Soc. Safety Engrs., Milwaukee Assn. of Commerce, Mason, Elk. *Address:* Cudahy, Wis.

Stanley Mansfield, engr. *b.* Feb. 29, 1892, Athens, O.; Athens Bus. Coll.; Columbus Bus. Coll., 1910; Goodyear Indus. U. of Akron, O.; Athens Daily Jour., 1909-1910; mgr. grocery company, 1910-1916; mgr. workmen's compensation div., Goodyear T. & R. Co., Akron, O., since 1916. *Member:* Amer. Soc. Safety Engrs., Natl. Safety Council Executive Committee, chairman Statistical Committee, Rubber Sect., N. S. C., Mason. *Address:* 1624 Ottawa avenue, Akron, O.

Graef Harry Hutcheson, Jr., engr. *b.* July 7, 1893, Seaford, N. Y.; M.E. Cornell U. 1916; since 1916 with Goodyear T. & R. Co. in the following depts.: experimental 1916-1917, aeronautical 1917-1920, safety 1920-1922, mgr. employes service dept. since 1922. *Author:* Observation Balloon Instruction Book for army and navy training during the World War; Prevention of Fire in Cement Houses presented before Rubber Sect. Natl. Safety Council at Buffalo convention, 1926. Ex-chairman Rubber Sect., N. S. C. (1926), *Member:* Mason, Alpha Sigma Phi, Alpha Delta Tau. *Address:* 870 Hereford Drive, Akron, O.

Myron H. Clarke, chem., *b.* July 25, 1881, Bedford, Mass.; S. B., M. I. T., 1903; chem. U. S. Rubber Co., 1903-1906; asst. supt. Boston Rubber Shoe Co.'s factory of U. S. Rubber Co., Malden, Mass., 1906-1912; factory mgr. (Naugatuck, Conn.) U. S. Rubber Co., 1912-1915; genl. facty. mgr. U. S. Rubber Co., 1915-1922; since 1922 pres. Tyer Rubber Co., Andover, Mass. *Member:* Boston Chamber of Commerce, Univ. Club, Boston, Mass.; Univ. Club, New York, N. Y., Masonic bodies. *Address:* Tyer Rubber Co., Andover, Mass.

Henry S. Doty, chem., *b.* Jan. 5, 1884, Yonkers, N. Y.; B. S. Columbia U. School of Applied Science, 1905; chf. chem., Manhattan Rubber Mfg. Co., Passaic, N. J., 1905-1917; rubber inspection div. gas defense plant, C. W. S., Long Island City, N. Y., 1917-1919; rubber chem. dept., Frazar & Co., New York, N. Y., 1919-1922; since 1921, president, Dovan Chem. Corp., New York, N. Y. *Member:* Amer. Chem. Soc., Columbia U. Club, New York, Hudson River Country Club, Amalkassin Club. *Address:* Dovan Chemical Corp., 30 Church street, New York, N. Y.

William Dalton Pardoe, chem., *b.* Sept. 8, 1883, Princeton, N. J.; B. S. 1905, M. A. 1908, Princeton U; 1905, Listers Agric. Chem. Co., Newark, N. J.; Instr. in Mineralogy, Princeton U. 1905-1908; research chem., Waclark Wire Co., Elizabethport, N. J., 1906-1907; chf. chem. Thermoid Rubber Co., 1909-1920; factory mgr. since 1920; revised Furman's "Manual of Practical Assaying-1908"; patented treatment of asbestos for use in brake lining and construction of brake lining. *Member:* Amer. Chem. Soc., Soc. Indus. Engrs.; A. S. T. M., 32nd degree Mason and Shriner. Engineers Club of Trenton. *Address:* Thermoid Rubber Co., Trenton, N. J.

Andrew D. Maclachlan, engr. *b.* Apr. 28, 1896, Cambridge, Mass.; S.B.S., M. I. T., 1921; Boston U., instructor in geometry, Franklin, Union, Boston, Mass.; engr. Metz Motor Co.; efficiency supt. Boston Woven Hose & Rubber Co., Cambridge, Mass.; mech. dev. engr., B. F. Goodrich Co., Akron, O. *Member:* Asso. member A. S. M. E. *Address:* 198 Aqueduct street, Akron, O.

THE INDIA RUBBER WORLD'S brief biographies of American rubber technologists are approved by leaders of the rubber industry because the ambition, imagination and practical accomplishments of these men are largely responsible for America's leadership in the world's rubber manufacturing industry. Technical superintendents, chemists, process and development engineers in rubber manufacturing and reclaiming plants, research, testing and service laboratories are invited to send their biographical data to us for publication.

What the Rubber Chemists Are Doing

X-Rays and Colloids[1]

George L. Clark

THE following excerpt from Professor Clark's treatise, "X-Rays and Colloids" has special interest for rubber chemists because it relates to the utilization of the radiation as a means to structural examination applied to crude rubber and balata.

Any sample of pure Hevea or vulcanized rubber produces the X-ray diagram typical for an amorphous material, namely, a single broad diffuse ring. This fact has, of course, been known for several years.

Crystalline Material in Raw Rubber

Many samples of rubber before mechanical treatment contain crystalline material. This is proved by the presence of practically continuous concentric rings indicating also random arrangement, in addition to amorphous bands. Katz reports the following results:

Rubbers	Crystal Interferences
Yellow crepe	Good
Thick white sole crepe	Good
Light brown crepe	Good
Ribbed smoked sheets	Very good
Washed and dried raw Para	Doubtful
Patent gummi, light yellow unvulcanized	Good
Patent gummi, brown unvulcanized	Excellent
Dried latex	None

These crystalline ring interferences on the films disappear when the rubber is masticated or heated and do not reappear. They remain where the raw rubber is stretched even to a large per cent extension. Hauser and Mark have been unable to discover crystals in any of their samples of raw rubber, and Clark and associates have found only doubtful evidences in one or two cases. Pummerer and Koch have been able recently to isolate colorless and comparatively non-elastic crystals from smoked sheets by repeated extractions and purifications. The analysis of the crystals indicated pure $C_5 H_8$.

Effect of Freezing Rubber

Katz, as well as others, has attempted to cause rubber to crystallize at low temperatures. All efforts so far have failed to produce any change in a product which gives the amorphous X-ray diagram. The results of experiments by Simons and Simson who are subjecting rubber to temperatures of minus 183 degrees C. for some time, will be awaited with interest.

Effect of Stretching Rubber

This effect is by far the most important of all those observed. In all cases when the rubber is stretched, the X-ray diagram shows a marked change. In addition to the amorphous ring which is always evident, but decreases in intensity with increase in elongation, there appear definite interference spots, which become sharper and more distinct the greater the stretching, but retain the same position. Pure Hevea rubber must be stretched about 75 per cent before the crystal-like spectrum appears. From here on to the breaking point the specimen produces a pure fiber diagram with the spots lying on hyperbolas. There is no tendency for the spots to merge into the rings characteristic of random arrangement. Hence, here is a case of the appearance during the stretching of metacrystalline diffracting material, all arranged parallel with respect to the direction of the applied tension. The exactness is indicated by the fact that the spots lie on hyperbolas as they should for perfect fibers. The interference points resemble those caused by true crystals. Thin, strongly stretched threads of pure rubber show crystal interferences of an intensity comparable with that obtained with pure organic compounds. Control researches with purest rubber, free from resins and foreign inclusions, show the structure, hence it may be concluded that the hydrocarbon (C_5H_8) is actively concerned.

Vulcanized rubber must be stretched as much as 250 per cent before the fiber structure appears. In this case the diagram at first approaches rings with strong localized maxima, indicating incompletely perfect orientation of the units. Most synthetic rubbers act similarly, although some break before they can be stretched sufficiently. Clark and Lanyon have found that the percentage elongation required to produce a good diagram depends very markedly upon the previous history and composition of a sample, some requiring as much as 800 per cent increase.

The entire phenomenon is reversible if the specimen is not too strongly stretched; that is, upon releasing tension the amorphous diagram is again obtained. In some cases evidences of fiber structure are still apparent a half hour or more after the release of tension, particularly when the specimen does not shorten to its original length.

Nature of the Crystals

The question which naturally occurs is whether this metacrystalline material existed before the stretching. It might be possible that the interferences are weak because they are distributed over the entire 360 degrees of the circular X-ray diagram, whereas they are concentrated into small, easily visible arcs upon stretching. However, all the evidence seems to support the contention that the crystals do not exist as such, prior to the stretching. When raw rubber which is partially crystalline even unstretched, is stretched, new interference maxima appear on the already apparent circles which persist even with the greatest tension. The latter disappear upon warming but the fiber diagram reappears upon weakly stretching the sample. Unstretched rubber is amorphous; stretched rubber has two constituents, metacrystalline and amorphous. Molecules or elementary units of an associated molecule in preformed swollen aggregates may arrange themselves regularly by virtue of the tension, and thus produce with certainty the metacrystalline condition.

Effect of Fillers and Inorganic Mixtures

Rubber mixtures containing sulphur, zinc oxide, magnesium oxide, litharge, ferric oxide, barium sulphate, mercuric sulphide, graphite and magnesium carbonate, show the typical fiber diagram for rubber when stretched. In addition all give rise to the rings characteristic for the finely powdered inorganic constitutents of the mixture. Only the grains of magnesium carbonate, under normal circumstances, show any tendency to assume a fiber arrangement during stretching, for above 300 per cent the magnesium carbonate rings become disconnected arcs. This method of examination should prove very fruitful in determining the size, properties and chemical combinations of the added inorganic substance after vulcanization, by comparison with the X-ray diagrams of the pure substance.

X-Ray Structure and Physical Properties

The facts brought out by the X-ray examination explain those physical properties which so peculiarly characterize rubber. During stretching for the first 75 per cent in pure rubber a gel substance characterized by small fluidity and large elasticity predominates. From this on threads or meta-crystals of a strongly

[1]Contributions from the Department of Chemical Engineering M. I. T. Serial No. 186, January, 1927, reprint from *Trans. Amer. Electrochem. Soc.*, 1926.

cohesive and much less ductile substance account for the much smaller elongation for a given force before breaking. The effect discovered by Joule in 1857, that rubber heats upon being stretched while other substances cool, is explained by the heat of crystallization. Upon the basis of the X-ray structures the material might be expected to cool in the first stages of stretching. Joule found that this was indeed true for rubber. The recent remarkable researches of Freundlich and Hauser with the micromanipulator have shown that the latex particles have an inner milky portion which becomes hard upon vulcanization, and an outer polymerized skin. These must be responsible, respectively, for the amorphous and the crystalline parts of the X-ray diagrams. The present writer has found that all hard rubbers indeed are amorphous in their ordinary state.

Determination of Hydrocarbon in Raw Rubber and Gutta Percha[1]

A. R. Kemp[2]

Unsaturation is one of the outstanding chemical properties of rubber and gutta percha. Up to the present time there has been no satisfactory method for determining this property. Bromine absorption methods have been widely used to estimate the unsaturation of organic compounds, but they have proved unsatisfactory for rubber. It was found that carbon bisulphide was an excellent solvent for rubber iodochloride and that there was practically no tendency for emulsions to form with this solvent, thus making it possible to determine accurately the unsaturation of rubber hydrocarbon by a rapid volumetric procedure. Further, it was found that under proper conditions no substitution took place with the iodochloride reagent.

A 0.1-gram sample of the material, from which the resins have been removed by extraction with acetone, or any other suitable method, is cut into small pieces and allowed to swell overnight in 75 cc. of purified carbon disulphide. (The ordinary C. P. carbon bisulphide was purified by allowing it to stand in contact with solid potassium hydroxide for 48 hours and finally distilling over same). Twenty-five cubic centimeters of 0.2 *N* Wijs solution[3] are then added from a pipet, and the flask is manipulated in such a way as to give a rotating motion to the rubber solution, thus preventing the formation of a precipitate. After the addition of the Wijs reagent a clear dark-red solution should result. The stoppers are then wetted with a drop of potassium iodide solution to prevent escape of iodine and the flasks placed in ice water for two hours. A blank determination is also prepared at the same time. At the end of this period 25 cc. of 15 per cent potassium iodide and 50 cc. of distilled water are added. The iodine liberated is then titrated with 0.1 *N* sodium thiosulphate.[4] Before the brownish color of iodine has disappeared 5 cc. of 5 per cent soluble starch solution are added as an indicator. Further addition of the thiosulphate solution changes the deep blue to a brown and then to a yellow. At this point the solution is shaken vigorously to remove the last trace of iodine from the carbon disulphide. When the end point has been reached the aqueous layer becomes milky white and should remain so after shaking. The difference between the blank and the sample titration is used to calculate the iodine number in the usual manner.

The theoretical iodine value of rubber hydrocarbon is 372.8, calculated on the basis of one double bond for each C_5H_8 group. The per cent unsaturation and per cent rubber hydrocarbon in the sample are calculated from the ratio of the iodine value of the sample to the theoretical iodine value.

[1] *Industrial & Eng. Chem.*, April, 1927, pp. 531-533.
[2] Bell Telephone Laboratories, New York, N. Y.
[3] The directions given by Fryer and Weston, "Oils, Fats, and Waxes," Vol. XI, p. 93, are recommended for the preparation of the Wijs reagent.
[4] The conditions recommended for standardization of the thiousulphate solution are given by Popoff and Whitman. *J. Am. Chem. Soc.*, 47, 2259 (1925).

Meeting of Chemical Engineers

The nineteenth annual meeting of the American Institute of Chemical Engineers, held at Cleveland, Ohio, May 31 to June 3, included a symposium on rubber. The papers presented on important phases involving applications of rubber are outlined in the following abstracts:

The Use of Solvents in the Rubber Industry. Specifications for the principal solvents, benzol, gasolines, carbon tetrachloride and carbon bisulphide were given, their uses indicated and processes for their practical recovery explained.

In principle, the methods employed for solvent recovery can be classified under four heads: (1) cooling, with refrigeration, when necessary; (2) compression; (3) absorption in liquid solvents; and (4) absorption on solid absorbents. When condensation of the solvent can be effected by lowering its temperature by cooling water only, that is the cheapest method. Generally, however, the recovery is relatively incomplete and the cooled gas carries considerable condensed vapor, both because of the high vapor pressure of the solvent and because of its high molecular weight. When resort to refrigeration is necessary it is usually cheaper to employ other methods. When the vapor concentration is very high, compression followed by water cooling is best. For moderate vapor concentrations the use of a liquid absorbent is best. When vapor concentrations are very low none of these methods give complete recovery.—R. P. Dinsmore and W. K. Lewis.

Rubber in Engineering. The word "rubber" is as indefinite as the word "alloy." The rubber technologist has developed compounds having widely varying properties. Thus there are compounds resistant to abrasion for tires, heels and conveyer belt surfaces. On the one hand the rubber transmission belt has frictional resistance, and a rubber bearing lubricated with water has an extremely low frictional resistance. The relatively great impermeability of rubber to water and steam has been extended to other applications so that oily vapors and many common hydrocarbon liquids are now economically handled in rubber hose.—J. W. Schade.

Hard Rubber for Chemical Industry. Improved technology has produced hard rubber pipe that has resistance to breakage in handling; flanged construction is now possible with safety; ordinary pipe hangers may be used; and higher operating pressures are now possible. The author pointed out that the Vulcalock process was adaptable to hard as well as soft rubber equipment. A new material termed "Aeroboard" was described. It is essentially a hard rubber product having a cellular structure, high thermal resistance and light weight. It can be fabricated like wood, and it is designed to replace wood in many applications.—J. R. Silver, Jr.

Development of the Auto Tire. The author estimates that tire service has increased at least fivefold during the past 15 years, so that the tire of today makes about ten million revolutions and under all sorts of driving conditions. Among the important developments during the past 20 years the paper cites rim design, bead design, the weftless carcass reinforcement, tire mold design, the water curing bag, compounding and curing of rubber and the low-pressure tire.—F. Zimmerli.

CRUDE RUBBER COMMITTEE A. C. S.

The Executive Committee of the Rubber Division met in Akron, Ohio, May 23. It was decided to set aside two days and a half for the divisional meeting at Detroit in September. The committee postponed the symposium of polymerization until a later meeting, possibly in combination with the Organic Division at St. Louis. The new Crude Rubber Committee was announced as follows: E. B. Spear, chairman; C. R. Boggs, H. E. Simmons, H. L. Trumbull, F. W. Stavely. Plans are being made to finance the continuation of the work of the Physical Testing Committee.

Chemical Patents

United States

1,627,636. VULCANIZATION. A vulcanizing process comprising the addition to the mixture to be vulcanized of a small proportion of tetramethyl-diameno-diphenyl-guanidine and then vulcanizing.—Cecil J. T. Crenshaw and William J. S. Naunton, assignors to British Dyestuffs Corporation, Ltd., all of Manchester, England.

1,627,725. COMBINING HALOGEN-CONTAINING MATERIALS AND RUBBER. The treatment of rubber with a solvent, introducing hydrochloric acid gas into the mixture, chlorinating the combined rubber and hydrochloric acid and recovering the resulting product.—Charles E. Bradley, Montclair, New Jersey, and Willis A. Gibbons, New York, N. Y., assignors to The Naugatuck Chemical Co., Naugatuck, Connecticut.

1,628,326. TREATMENT OF RUBBER. The method of making a rubberized fibrous composition which comprises treating a quantity of rubber cement with hydrogen sulphide and sulphur dioxide. After their interaction for a short time the mixture is diluted with rubber solvent prior to its jellation, thoroughly separated fibers are added and the rubber precipitated upon them, after which the fibers are strained from the liquid and permitted to jell.—William G. O'Brien, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio.

1,628,528. AGE RESISTER. The process of preserving a cured rubber composition by mixing with the composition before curing a substance adapted to retard aging of the rubber.—Ernest R. Bridgwater, Wilmington, Delaware, and Donald H. Powers, Penn's Grove, New Jersey, assignors to E. I. du Pont de Nemours Co., Wilmington, Delaware.

1,628,986. INSULATING MATERIAL. A jointing compound for rubber insulated cables comprising the following ingredients in approximately the proportions named: rubber 40 per cent, zinc oxide 34 per cent, litharge 20 per cent, sulphur 4 per cent and paraffin 2 per cent.—A. R. Kemp, East Orange, New Jersey, assignor to Western Electric Co., New York, N. Y.

1,629,862. TYPE CLEANING COMPOUND. A composition for cleaning type consisting of a base of powdered inert mineral substance, rubber, factice, a heavy mineral filler, a slightly volatile mineral oil and emollient.—Eberhard L. Faber, New York, N. Y., assignor to Eberhard Faber Rubber Co., a corporation of New Jersey.

1,629,924. MOLDED ARTICLES FROM LATEX. To latex is added a vulcanizing combination and a substance capable of modifying its natural protective colloid to form a gel. The fluid mixture is poured in a mold, dried and cured at higher than room temperature.—John McGavack, Jackson Heights, New York, assignor to The Naugatuck Chemical Co., Naugatuck, Connecticut.

Dominion of Canada

270,784. FLAME-PROOF ELECTRICAL INSULATION. The method comprises intimately mixing the material with chlorinated naphthalene, powdered silica, a vulcanizing agent, and a substance for accelerating vulcanization, then curing the material.—The Western Electric Co., Inc., New York, N. Y., assignee of Earl G. Sturdevant, Oak Park, Illinois, U. S. A.

271,204. MOLDED ARTICLES FROM LATEX. An object is formed in a mold from uncoagulated latex containing a gelling agent and a curing combination by gelling in the mold, drying at moderate temperature and curing.—The Dominion Rubber Co., Ltd., Montreal, assignee of John McGavack, Jackson Heights, Long Island, New York, U. S. A.

271,205. LATEX PROCESSING. A method of treatment comprising adding an unhydrolized creaming agent to the latex to cause the separation of a layer of thickened and concentrated latex. This is withdrawn and heated at a temperature below 100 degrees C.—The Dominion Rubber Co., Ltd., Montreal, assignee of John McGavack, Jackson Heights, Long Island, New York, U. S. A.

271,219. VULCANIZING PROCESS. This comprises mixing the rubber substances with vulcanizing ingredients and aldehyde-amine condensation products under conditions whereby water is liberated and then heating the mixture to vulcanizing temperature.—The Grasselli Chemical Co., Cleveland, Ohio, assignee of Ira Williams and Waldo B. Burnett, Pittsburgh, Pennsylvania, both in U. S. A.

271,245. ACCELERATOR. Age resisting rubber compounds are made by heating rubber and sulphur in the presence of a compound obtained by interacting an organic base and a derivative of benzene containing more than one hydroxy group.—The Rubber Service Laboratories Co., assignee of Winfield Scott, both of Akron, Ohio, U. S. A.

271,246. ACCELERATOR. The product obtained by reacting an aldehyde with an amine; treating the reaction product so formed with a small amount of acid; neutralizing the acid and treating the material with an additional quantity of an aldehyde.—The Rubber Service Laboratories Co., assignee of Winfield Scott, both of Akron, Ohio, U. S. A.

United Kingdom

267,317. BITUMINOUS COMPOSITIONS. The residual products of the manufacture of gutta percha or balata are added to bitumen or bituminous mixtures to improve their properties for road making, etc. Example: 10 per cent of balata pitch is added to 43 per cent of Mexphalt E, 43 per cent of fine mineral filler and 4 per cent of fluxing oil.—Universal Rubber Paviors, Ltd., Canning street, Audenshaw, near Manchester, and A. E. Brown, Kavanagh Lodge, Brentwood, Essex.

267,808. SYNTHETIC RUBBER. Liquid polymerization products are removed from synthetic rubber by treating it with a porous absorbent, such as activated carbon, in a powdered condition.—W. Carpmael, 24 Southampton Buildings, London (I. G. Farbenindustrie Akt. Ges., Frankfort, Germany.)

268,219. PRESERVING LATEX. Latex is preserved by adding to it an organic antiseptic and an alkaline phosphate. For ordinary shipping the maximum is 0.5 per cent of formaldehyde and 1.5 per cent of sodium phosphate.—General Rubber Co., 1790 Broadway, New York, assignees of A. E. Jury, Rutherford, New Jersey, and O. H. Smith, New York, N. Y., all in U. S. A.

268,280.† RUBBER COMPOSITIONS. Preferable proportions for cork and emery compositions for molding into tires or other articles are as follows: 20 parts rubber, 2.5 parts of cork, and 3 parts of emery, together with vulcanizing agents, accelerators, etc.—R. Grimoin-Sanson, 40 Rue Francois, Paris, and H. Danel, 1 Boulevard Gallienti, Argenteuil, Seine-et-Oise, France.

268,299.† TREATING LATEX. A concentrated latex of low viscosity is produced by adding an unhydrolized creaming agent to latex; separating the layer of thickened latex from the serum and subjecting it to a hydrolizing action. Suitable creaming agents are vegetable colloids such as pectin, Irish moss or Karaya gum.—Naugatuck Chemical Co., Naugatuck, Connecticut, assignee of John McGavack, 561 West 58th street, New York, N. Y., both in U. S. A.

268,717.† ELECTROLYSIS. The electrolytic deposition of rubber proofing on fabrics.—Kodak, Ltd., Kodak House, Kingsway, London, assignee of S. E. Sheppard and C. L. Beal, Kodak Park, Rochester, New York, U. S. A.

†Not yet accepted.

Germany

444,441. Accelerating vulcanization. I. G. Farbenindustrie A.-G., Frankfurt-am-Main.

444,993. Condensing latex. K. D. P., Ltd., London. Represented by, Dr. Carl Bohm von Börnegg, Bockenheimer Aulage 45, Frankfurt-am-Main.

445,534. Preventing colored unvulcanized rubber from discoloring. Continental-Caoutchouc- und Gutta-Percha Compagnie, Hannover.

SYMPOSIUM ON RECLAIMED RUBBER

The Rubber Division of the American Chemical Society will hold a symposium on reclaimed rubber at its meeting in Detroit during the week of September 6. It is proposed to include in this symposium only concise informative technical papers on the industrial and manufacturing phases of the production of reclaim and its uses. The tentative outline of the symposium proposed by the Executive Committee is as follows:

PROCESSING

Methods of producing reclaim and devulcanization processes. For example: acid, alkali, and open steam processes, use of high and low temperatures, etc. Modern methods and improved processes only.

Effect of repeated reclaiming of the same lot of material.

Processing of various types of scrap.

Processing for various uses: tires, boots and shoes, insulated wire, various mechanicals.

Changes during devulcanization: chemical, physical.

Methods for evaluation of reclaim.

USES OF RECLAIM

Effect of various process reclaim on physical properties of vulcanized rubber: tensile and stress-strain, abrasion, flexing resistance, loading.

Effect of high and low temperature cure.

Effect of using high sulphur vs. low sulphur in vulcanizing reclaim.

Dispersion of pigments in reclaim.

Effect of aging of raw reclaim on handling and vulcanizing properties.

The Detroit meeting will not be devoted entirely to this symposium. About half of the time will be occupied by a program of the usual technical papers.

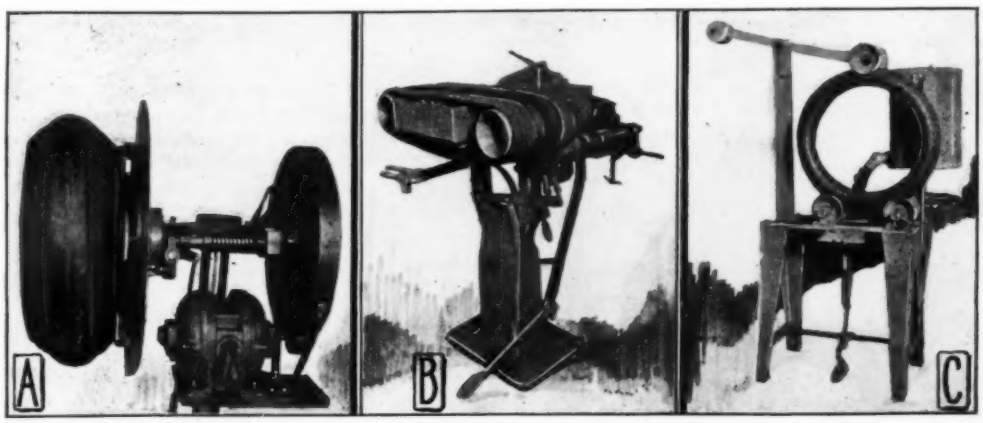
RUBBER COLORS USED IN ENGLAND

The following is quoted from a report by the Trade Commissioner at London to the Department of Commerce:

"Until comparatively recently, the only practicable method of obtaining satisfactory colors on heat cured rubber was to use inorganic pigments. Today quite a range of organic colors is used in England, that have been found particularly suitable for this use. Two groups of organic colors are used, those soluble in water and insoluble in water. Soluble colors are used first to form a lake color while the insolubles are mixed directly into the rubber. As the nature and quality of rubber differs widely with the different ingredients in accordance to its use, it is necessary to select colors for particular purposes. The best results are claimed with organic colors in press cured rubber."

Tire Painting Machines

IN the production of tires it is advisable to apply a coating of solution to the inner surfaces of the casings before or after curing them. The purpose of this painting operation is to protect the tire casing from absorbing moisture, to render it easily removable from contact with the core or airbag and to give an inside finish to the tire. For this work three special machines have recently been developed to meet modern tire making methods, and they are shown in the accompanying group illustration. That



Utility Manufacturing Co.'s Tire Painting Machines

for coating the inside of core built raw tires preliminary to the insertion of the airbags is shown in picture *A*.

Core Built Uncured Tires

This machine has a 4-jaw self-locking chuck of unique design. It is operated by a large hand wheel and grips the tire by one bead only as the latter is revolved at 125 r.p.m. The machine is motor driven and controlled through a slow speed cone clutch and has an automatic brake that brings it to a quick stop when the clutch is released. All moving parts are guarded.

The painting of a tire is effected by the operator inserting a fixed amount of the paint solution in the casings and spreading it around with a swab or brush. The centrifugal force of the revolving tire keeps the solution within the casing and distributes it evenly by operator using a round brush or swab. Following the painting the airbag can be inserted immediately as the casing is held in convenient shape for this operation. The capacity of the machine is from 1,000 to 1,500 casings in eight hours.

Band Built Uncured Tires

A distinctly different type of machine, *B* in the illustration, is designed for painting flat band raw tires before they are formed up and mounted for curing. This also is motor driven. It is horizontal and has two pulleys over which the band tire is placed. One of the pulleys is movable and when air is applied to a cylinder it stretches the tire taut. This movement also engages the clutch and starts the tire traveling on the pulleys. A rectangular tank located between the pulleys holds the solution. A cylindrical stiff bristle brush mounted in the tank is raised by means of a foot treadle and applies the solution to the inside of the tire band upon which a squeegee smooths and forces the liquid into the spaces between the cords. After applying the paint the operator lowers the brush by releasing the treadle and allows the tire band to continue to revolve until the solution is smoothly distributed. When the air pressure in the cylinder is released the tire band becomes quite loose and is easily removed from the pulleys. This machine like the first has a capacity of 1,000 to 1,500 tires in eight hours.

Cured Tire Painter

A machine of still different design is required for painting finished cured tires. This is pictured in *C* of the group. The machine serves as a means of holding the tire at three points of support with concave rollers within which it is revolved at the rate of about 100 r.p.m. A solution tank is supported above the standard of the machine provided with a swing arm outlet with gate opening valve for discharge of the solution directly into the tire casing. The tank contains a continuous driven agitator located very close to the bottom to keep the solution in uniform suspension. The operator quickly becomes adept in judging the amount of solution needed for a single casing, draws it and distributes it with a round brush or swab, being careful not to let it pass over the edges of the casing. The centrifugal force of the revolving tire keeps the paint within the tire. The capacity of this machine is somewhat greater than that of the others, being from 1,200 to 1,800 casings in eight hours.

A selection of these machines, according to the method of making employed, affords a neat, economical and efficient means for doing what otherwise would be a disagreeable, wasteful job.

EXPORTS OF GARTERS AND SUSPENDERS

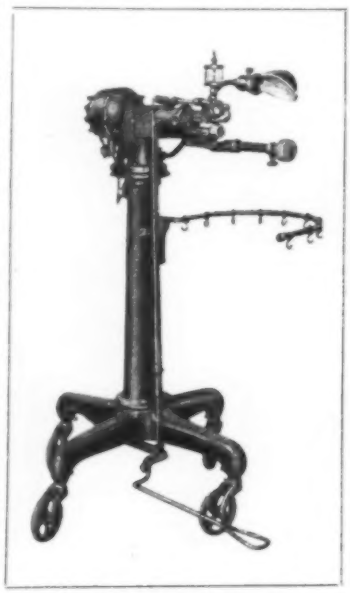
The Latin American countries are the largest foreign consumers, according to *Commerce Reports*, of the garters, arm bands, and suspenders produced by United States manufacturers. In 1925 the combined exports to these countries of this class of goods represented a value of $435,455, or 53 per cent of the total amount exported, while shipments in 1926 were valued at $473,348, or 51 per cent of the total. The next best markets for these commodities were the United Kingdom and the British colonies, whose purchases in 1926 aggregated $375,253. In 1926 New Zealand's purchases from the United States of suspenders reached a value of $24,985 which with a corresponding purchase by Columbia valued at $24,475, represented 43 per cent of the total value of exports of this commodity.

THE NUMBER OF AUTOMOBILES USED IN SWEDEN IS STEADILY increasing, according to *Commerce Reports*, and there has been a consequent gain in imports of automotive goods of various kinds. Under the heading "Crude rubber, oils, tars, etc.," the following figures are given for imports: 1925, 116,006,000 crowns; 1926, 130,570,000 crowns. The Swedish crown is valued at $0.2684 and $0.2676 for 1925 and 1926 respectively.

New Machines and Appliances

Lining Trimming Machine

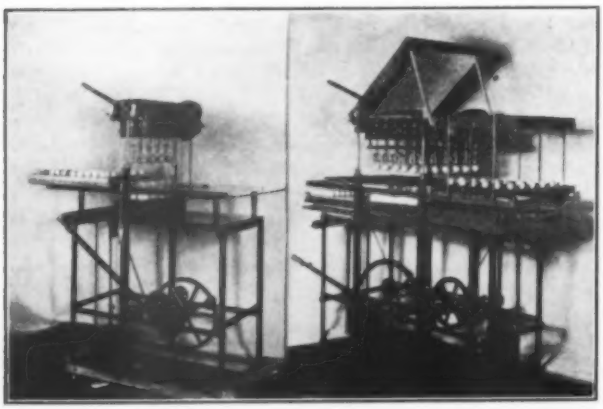
THE machine here pictured is designed to supersede hand knife trimming for removal of the surplus lining which is inevitable in the construction of most types of rubber boots, overshoes, gaiters, etc. The machine is portable and motor driven so that it can be utilized at any point in the shoe packing room and operate from a lamp socket.



Model B Lining Trimmer

The cutting feature of the machine comprises a pair of rotary disk knives directly connected with the motor. The upper cutter can be raised by the action of a treadle connection in order to admit the edge of the shoe to be trimmed. A knurled handle projecting beyond the cutters is used by the operator to regulate the feed of the work as he guides it through the cutters close to the finished edge of the article. The machine is surmounted by an oil cup and an adjustable electric light with reflector. Attached to the pedestal is a semi-circular rod which carries a series of hooks for holding the scrap bag for receiving the trimmings produced. An expert operator will trim with this machine from 200 to 300 pairs per hour, with no damaged shoes.

Where this machine is used the goods can be promptly removed from the lasts as soon as cool. Thus the return of the lasts to the makeup room is hastened and they are not subject to damage as in trimming the goods upon them by hand knife. Model *A* shoe trimmer, not shown, is similar in design and suited especially for light weight shoes, rather than boots, etc.—United Shoe Machinery Corporation, Boston, Massachusetts.

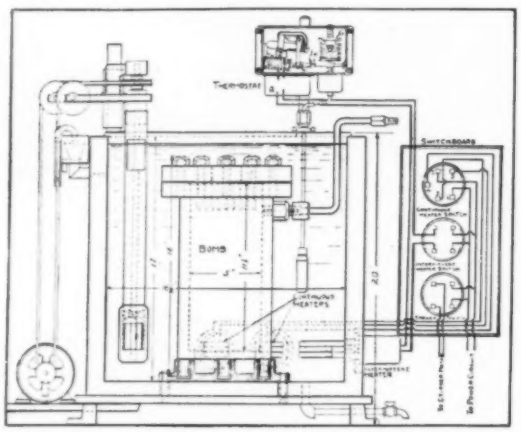


NINE BALL THIRTY-SIX BALL

Gabriel Golf Ball Painting Machines

Aging Bomb Water Bath

The Bierer-Davis aging test bomb is located during a test, either in an oven with thermostatic control or in a water bath heated and regulated electrically. The diagram illustrates the construction of this water bath with the bomb in position for a test. The bath is equipped with a motor-operated device for equalizing the temperature of the bath, which is heated by both intermittent and continuous electric heaters under thermostatic and switchboard control. The current capacity of the bath is 1,800 watts. The small size bomb can be used in either the oven or the water bath. The large size bomb is too heavy to be conveniently placed in and withdrawn from an oven and therefore should be used with a water bath. Between tests the charge in the bomb can be replaced by lowering the water level below the flange on the bomb and removing the cover without moving the bomb from the bath.—Emerson Apparatus Co., 171 Tremont street, Melrose, Massachusetts.



Bierer-Davis Water Bath

Golf Ball Painting Machine

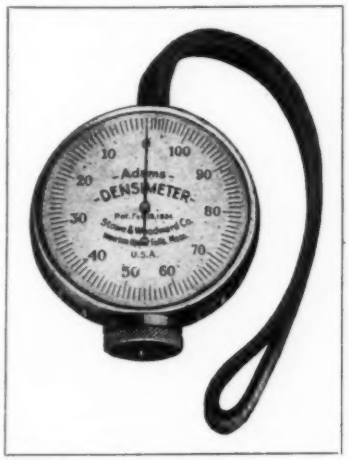
In general construction and mechanism the golf ball painting machines here illustrated are essentially the same. The smaller paints 9 and the larger paints 36 balls at a time. Below on the frame a counter-balanced arrangement of gearing serves to lower and raise the balls during the painting operations. Referring to the 9-ball machine, a box rests on its deck holding 9 deep glasses containing the paint supply.

In operation, unpainted balls, arranged in a tray sliding on rails, are pushed under the head where a series of grips descend and pick up 9 balls. The tray being pushed on to the unloading side of the machine, the balls are dipped in the paint, then raised above its level but not out of the glasses until after they are made to spin for removal of the excess paint. This is done by the motor-driven mechanism in the head. After spinning, the balls are released from the grips into the tray. When this is full it is removed for drying.

This machine is operated by one man and helper, making three painting cycles a minute or 135 dozen balls an hour. The 36-ball machine is similarly arranged and is operated by one man and two helpers, painting 540 dozen balls an hour.—Gabriel Machine Co., Inc., 160 Pearl street, New York, N. Y.

Rubber Densimeter

The densimeter here pictured is a rugged scientific instrument for determining the density of rubber in accordance with a standard scale. It is useful for mill and laboratory and may be used for testing any rubber article. For convenience in handling, a leather loop strap is fastened to the instrument. The pressure necessary to press the test point inward to the level of the disk is read and noted on the dial. Its reading multiplied by two gives the plasticity as shown by the plastometer.

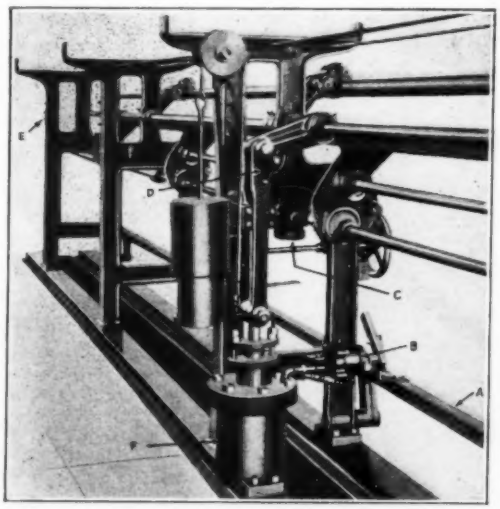


Adams Densimeter

The instrument can be carried conveniently in the pocket ready for instant inspection of any cured article. It is indispensable for the inspector on such articles as rolls and other objects where exact cure is required for proper service.—Stowe & Woodward Co., Newton Upper Falls, Massachusetts.

Improved Hose Cross Wrapping Machine

An improved hose wrapping machine for cross wrapping 50-foot lengths of hose is here pictured. The machine is 52 feet long and is driven by a three h.p. motor, with specially designed



Thropp's Improved Hose Wrapper

control, dynamic braking, and thermal overload protection. Its operation is similar to that of the usual three-roll wrapper. The differences are as follows: When the poled hose is laid between the lower rolls, pressure on the foot treadle *A* operates an air valve *B* which allows the top roll to descend on the hose. A time limit yoke *D* allows the roll to rest on the hose before an electric switch is operated by the travel of the connecting rod to start the motor. Raising the treadle *A* applies the air to the stopping cylinder *F* shutting off the motor instantly with dynamic braking when the time limit yoke *D* raises the top roll. This feature prevents the motor from operating before the upper roll rests on the hose and stops the motor before raising the upper roll off the hose. This device gives more positive action and three times greater speed than the old system of cams and clutches.

There is provided also a mechanical and electrical mechanism which prevents the operator from lowering the top roll and starting the motor. It is impossible to start the motor when all three rolls are together without material between them and also when the top roll is up. The Alemite system of lubrication is installed in the machine, indicated at *E* in the picture.—William R. Thropp & Sons Co., Trenton, New Jersey.

Tire and Airbag Buffer

Buffing the exterior of tires and airbags for repairs is easily and perfectly done by the power machine here illustrated. It is of rugged design, mounted on a heavy stand. The buffing tool is attached to a heavy swivel bracket and operated by a 1½ h.p. motor. The buffing wheel is made up of inexpensive sectional cutters, exceptionally easy to regrind or replace. When the buffing attachment is not in use it may be swung back and the machine used as a power stand for building work. The spindle has two speeds, 9 and 125 r.p.m. It is mounted on ball bearings and driven through reduction gears and multiple disk clutch, operating in oil. The motor is controlled by an oil reversing switch.—De Mattia Brothers, Inc., Clifton, New Jersey.

De Mattia Tire Buffer

Endurance Paper Testing Machine

The testing machine here illustrated was invented by Professor V. Bush of the Massachusetts Institute of Technology and is known as the M. I. T. folding endurance tester. It is a standard machine for use in testing insulating papers and can be used for testing any other kind of paper within its capacity.

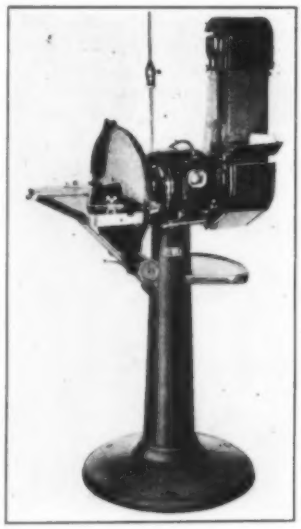
In operation, strips of paper 1.5 cm. wide are clamped between two jaws, the lower of which rotates through a given angle, and the paper is thus folded forward and backward around a certain radius. The upper head is attached to a weighing system so that a definite tensile load may be applied to the sample during the folding test.

M. I. T. Paper Tester

A counter is provided for noting the number of folds required to cause the specimen to break under the conditions applied. Both counter and machine are automatically stopped when the specimen breaks.—Tinius Olsen Testing Machine Co., 500 North 12th street, Philadelphia, Pennsylvania.

Belt and Disk Sander

The machine here pictured combines on a single base facilities for rough and finished grinding and provides the advantages of both types of machines, with economy of floor space. Two men can work at the same time on separate jobs or one man can handle some jobs on both the belt and disk at once.



Porter-Cable Sander

The disk side of the machine has a large table which can be tilted up and down through a range of 55 degrees or be removed to allow use of the entire face of the disk. An angle gage and a core print gage operating in a slot in this table make it possible to secure compound angles and also a variety of curves. A vacuum dust collecting system is built into the machine. This consists mainly of fans at the back of the disk which produce a vacuum in the housing, thus drawing down the dust and forcing it through the pedestal to the floor. A three-fourth h.p. ball bearing motor supplies the power to operate both the disk and the belt. The latter also has a table and angle gage which may be readily removed and tilted up or down.

Work of 18 inches in length can be sanded by the belt when the table and upper dust gage are removed. The bed under the belt may be moved through an arc of 90 degrees. This enlarges the capacity, makes it more convenient and in effect provides three machines in one.—The Porter-Cable Machine Co., Syracuse, New York.

Westinghouse Linestarter

The value of a motor starter is measured largely by the degree of protection which it affords the motor. The new Westinghouse Linestarter offers a reliable form of overload protection for motors that depends primarily upon their capacity for absorbing heat. The motor can be repeatedly started and stopped all day long—but the high, instantaneous starting current peaks have little heating effect on the motor, and consequently the relay will remain inoperative.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania.

Machinery Patents

United States

1,627,779. FOLDER FOR PRESSURE BAGS. By this device pressure bags can be folded for insertion into pneumatic tires prior to vulcanization without undue strain on the bag. At the same time the overall width of the folded bag is decreased, making it easier of insertion. The method for accomplishing this comprises a standard upon which is arranged a set of pins and rollers engaging the inside and outside periphery of the bag. The folding device is actuated by air pressure.—W. F. Irrgang, assignor to The Fisk Rubber Co., both of Chicopee Falls, Massachusetts.

1,628,286. RUBBER TUBES. Inner tubes are made from continuous strip stock delivered direct from the calender, eliminating liners and the need of storage and other operations incident to the usual method for tube making. The calendered stock is received on a conveyer, passes vertically as a loop or festoon over rolls from which it is drawn intermittently by a horizontal conveyer with a supported upper surface upon which the cut section of sheet rubber is rolled on a mandrel.—James D. Few, Hudson, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,628,836. BIAS CUTTER. A calender with a vertical series of even speed rolls is so arranged that it will apply rubber coating to a sheet of fabric fed between the center rolls. The rubber so applied is disposed in diagonal thick and thin zones. The combined rubber and fabric sheet is bias cut as it passes between the bottom pair of rolls by a series of spirally arranged blades on the surface of the bottom roll.—John R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,628,869. RUBBER MASTICATOR. According to this invention washed and dried crude rubber is passed between the rollers of an ordinary masticating mill and then to a suitable conveyer to and from the mill. On this convever it is cooled by a current of cold air forced by an adjacent fan.—Harry C. Young of Sutton and Henry O. Burr of Walney, England, assignors to Dunlop Tire & Rubber Corporation of America.

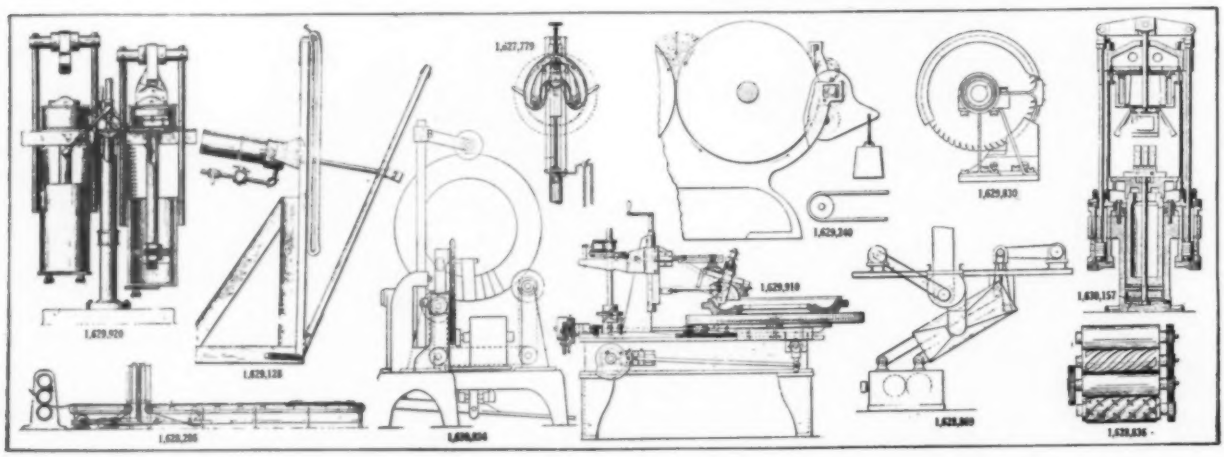
1,629,128. APPARATUS FOR DEFLATING TUBES. A vertical stand is arranged consisting of a flat surface upon which a couple of inner tubes are hung for deflation. This is accomplished by a vacuum applied by a cylinder as the tubes are pressed between the surface upon which they are hung and another movable one drawn up as each pair of tubes is deflated.—Horace D. Stevens, assignor to The Firestone Tire & Rubber Co., both of Akron, Ohio.

1,629,240. UNLOADING DEVICE FOR RUBBER REFINING MILLS. A pair of adjustable rolls is mounted on the mill frame of a refiner just below a roll scraping knife. The sheet of refined rubber removed by the knife bends downward by reason of its great flexibility and comes into contact with the surface of the upper of the two rolls and is thrown back into contact against the face of the sheet immediately in advance of the sheet. It is thus formed into a roll which enlarges in size until its diameter and weight cause it to become overbalanced when it falls off onto a conveyer and is carried to the next operation.—Roy S. Trowbridge, Butler, New Jersey.

1,629,830. SHEET RUBBER SPLITTING MACHINE. This machine comprises a circular disk-toothed knife which by rapid rotation splits apart flat sections of rubber held in clamps. The latter are slidably mounted on the bedplate of the machine.—L. L. Lyons, Omaha, Nebraska.

1,629,910. MOLD ENGRAVING MACHINE. This invention relates to machines for the purpose of engraving patterns in molds for curing rubber articles, particularly non-skid patterns in tire molds. Its special feature is an improved design of tool carrier and its adjuncts as adapted for automatic action. The pattern is obtained by the relative movements of the tool and the mold about a single area of the mold cavity. The cross-section of the bead of any desired contour can be obtained. Andrew J. Fleiter and Theodore A. Miller, assignors to The Akron Standard Mold Co., all of Akron, Ohio.

1,629,920. APPARATUS FOR MAKING RUBBER FOOTWEAR. This is a duplicate machine performing the operation of uniting the cemented edge of a rubberized fabric shoe lining, stretched over a last, and a rubberized fiber or rag stock innersole underlying the lining. The adhesive effect is produced by the downward motion of an L-shaped pressure foot bearing upon the instep of the last supported upon a rest containing heating elements. The pressure is exerted by air pressure cylinders.—Frank J. MacDonald, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.



1,630,157. MOLDING APPARATUS. This machine comprises an hydraulic press in which all the mold parts are fixed in such arrangement that there are no loose parts to be handled by the operator and no loose plates to be withdrawn or adjusted. It is primarily designed for forming and vulcanizing battery boxes and contains a novel circulating system by which a heating medium may be properly and equally distributed.—John M. Ahlgren and Joseph V. Bretaud, assignors to American Rubber Products Co., all of Detroit, Michigan.

1,630,834. TIRE WRAPPING MACHINE. This machine is so designed that it is only necessary for the operator to center the shuttle with respect to the tire. No adjustment is necessary to obtain for each different size tire or object the proper inclination of winding of the strip and the proper surface contact of the strip with the tire.—Jasper Derry, Medford, assignor to Andrew Terkelsen, Boston, both in Massachusetts.

1,627,613 Packing receptacle. Charles E. Manderbach, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,627,661 Last for arctics. Charles H. Morrill, Swampscott, Massachusetts, assignor to United Shoe Machinery Corporation, Paterson, New Jersey.

1,628,122 Tire patching machine. Julius P. Curls, Coffeyville, Kansas.

1,628,168 Testing and deflating machines. Sven Malke, Milwaukee, Wisconsin.

1,628,203 Machine for uniting sheet rubber. Jacob Stein, New York, N. Y.

1,628,304 Sectional airbag. Richard S. Burdette, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio.

1,628,315 Cutting tool. Charles E. Hamilton, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio.

1,628,766 Automatically controlled, electrically heated vulcanizing apparatus. Roscoe A. Brooks, Chicago, Illinois, assignor to Edward George Mumford and Henry B. Kruse.

1,628,817 Tire trimmer. George F. Wilson and Charles W. Leguillon, Akron, Ohio, assignors to The B. F. Goodrich Co., New York, N. Y.

1,628,899 Electric repair vulcanizer. Morton Murphy, Indianapolis, Indiana.

1,629,170 Apparatus for forming sleeves and associating them with articles. Gilbert L. Matthias and Waldemar D. Kmentt, Akron, Ohio, assignors to The B. F. Goodrich Co., New York, N. Y.

1,629,660 Apparatus for forming dovetail or undercut recesses in plastic material. Lucien Gaisman, Audenshaw, and Arthur Edward Brown, Brentwood, assignors to Universal Rubber Paviors (Manchester, 1923), Ltd., Audenshaw, near Manchester, all in England.

1,629,921 Furnace for supplying drying gases. Daniel E. Mansfield, Weehawken, New Jersey, assignor to General Rubber Co., New York, N. Y.

1,630,113 Tire vulcanizing mold. Peter De Mattia, Passaic, assignor to De Mattia Brothers, Inc., Garfield, both in New Jersey.

1,630,244 Apparatus for renewing surfaces of golf balls. William P. Hammond, East Orange, New Jersey.

1,630,376 Tension mechanism. Jasper Derry, Medford, assignor to Andrew Terkelsen, Boston, both in Massachusetts.

1,630,412 Centrifugal machine. William Burton Wescott, Dover, Massachusetts.

1,630,457 Vulcanizing apparatus. Herbert K. Wheelock, Akron, Ohio.

1,630,716 Spiral forming machine. Robert C. Pierce, assignor to John R. Gammeter, both of Akron, Ohio.

1,630,722 Bead placing device. William C. Stevens, assignor to The Firestone Tire & Rubber Co., both of Akron, Ohio.

1,630,815 Tire repair vulcanizer. Herbert K. Wheelock, assignor to The Akron Tyrwelder Co., both of Akron, Ohio.

1,630,922 Apparatus for the manufacture of electric wires. Harry B. Burley, Brookline, Massachusetts, assignor to Boston Insulated Wire & Cable Co., a corporation of Massachusetts.

1,631,042 Tire repair vulcanizer. George W. Lewis, Oilton, Oklahoma.

1,631,082. Machine for braiding elastic fabrics. Jacquin M. C. Branco, Somerset, assignor of one-half to James K. Lanning, Fall River, both in Massachusetts.

Dominion of Canada

270,599 Tire repair vulcanizing apparatus. Albert Matthews, Victor St. Clair Mailley, and Henry William Rawley, all of Brighton, Sussex, England.

270,903 Mold for curing inner tubes. Michael A. Flynn, Akron, Ohio, U. S. A.

270,904 Device for locating inner tubes in molds. Michael A. Flynn, Akron, Ohio, U. S. A.

270,905 Tube vulcanizer. Michael A. Flynn, Akron, Ohio, U. S. A.

271,207 Tire cover machine. The Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ontario, assignee of Colin Macbeth, Four Oaks, and John Mitton, Birmingham, both in County of Warwick, England.

271,214 Machine for inserting airbags in tire casings. The Goodyear Tire & Rubber Co., assignee of Elov F. Maas, both of Akron, Ohio, U. S. A.

271,217 Control device. The Goodyear Tire & Rubber Co., assignee of Alov F. Maas, both of Akron, Ohio, U. S. A.

New Zealand

57,969 Vulcanizer. Frederik Nielsen, Grandview Parade, Epping, near Sydney, New South Wales, Australia.

Germany

987,966 Machine for rolling out rubber. Eisenwerk Gebrüder Arndt G. m. b. H., Fennstrasse 21, Berlin N. 39.

989,286 Vulcanizing press. Veni-Apparate-Bau-Gesellschaft m. b. H., Königswinter a. Rhein.

989,287 Shell for vulcanizing pneumatic tires. Veni-Apparate-Bau-Ges. m. b. H., Königswinter a. Rhein.

United Kingdom

267,309 Apparatus for finishing fabrics. A. Crompton, Ashton Old Road, Openshaw, Manchester.

267,449 Footwear vulcanizing mold. D. F. Wilhelmi, Doorwerth, near Arnhem, Holland.

267,464 Drying furnace. General Rubber Co., New York, N. Y., assignee of D. E. Mansfield, Weehawken, New Jersey, both in U. S. A.

267,567† Tire repair vulcanizer. J. M. Piquera, 50 Boulevard de la Villette, Paris, France.

267,678 Pneumatic tire builder. F. A. Krusemark, Akron, Ohio, U. S. A.

268,107 Vulcanizing mold. J. A. Spencer-Smith, 138, Argyle Road, Ealing, London.

268,223 Device for painting golf balls. T. Grave, 23, North street, Maryport, Cumberland (J. C. Grave, Singapore, Straits Settlements).

268,732† Vulcanizing apparatus. Kuhlke Machine Co., assignee of O. J. Kuhlke, both of Akron, Ohio, U. S. A.

† Not yet accepted.

Process Patents

United States

1,627,698 Packing. John R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,627,785 Vulcanizing tires. Stanley Krall, Longmeadow, assignor to The Fisk Rubber Co., Chicopee Falls, both in Massachusetts.

1,627,799 Tire construction. Thomas Midgley, Hampden, assignor to The Fisk Rubber Co., Chicopee Falls, both in Massachusetts.

1,628,195 Coagulum rubber articles. Robert W. Rost, Newark, New Jersey, assignor of one-half to Andrew F. Bigger, New York, N. Y.

1,628,361 Elastic webbing. Harold St. J. Guild, Jamaica Plain, Massachusetts.

1,628,821 Hollow annular articles. John J. Callahan and Francis C. Rogers, Akron, Ohio, assignors to The B. F. Goodrich Co., New York, N. Y.

1,628,832 Fabric covered strip material. Abram E. Falor, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,628,979 Utilizing flexible molds for producing sponge rubber articles. Harry M. Hood, Chicago, Illinois, assignor to Featheredge Rubber Co., Inc., a corporation of Illinois.

1,629,013 Continuous process of producing sponge rubber articles. Frank V. Wedlock, Chicago, Illinois, assignor to Featheredge Rubber Co., Inc., a corporation of Illinois.

1,629,487 Paving blocks and slabs made of rubber compound. Edmond Draullette, Paris, France.

1,629,517 Tire casings. Thomas C. Marshall, Mount Savage, Maryland.

1,630,012 Attaching rubber seal rings in metal containers. Ely C. Hutchinson, Oakland, assignor to The Pelton Water Wheel Co., San Francisco, both in California.

1,630,411 Treating latex and product thereof. William Burton Wescott, Dover, Massachusetts.

1,630,721 Sponge rubber. Walter O. Snelling, Allentown, Pennsylvania.

Reissue

16,619 Manufacturing valve stems. Alexander W. Limont, Bridgeport, Connecticut. Filed August 25, 1924, Serial No. 734,130. Original No. 1,446,468, dated February 27, 1923, Serial No. 484,511, filed July 13, 1921.

Dominion of Canada

270,518 Composition bowling pins. The Brunswick-Balke-Collender Co. of Canada, Ltd., Toronto, Ontario, assignee of The Brunswick-Balke-Collender Co., Wilmington, Delaware, and Chicago, Illinois, assignee of Joseph W. Bishop, Muskegon, Michigan, all in U. S. A.

270,745 Composite article. The International Western Electric Co., Inc., New York, N. Y., assignee of Leslie F. Lamplough, Chicago, Illinois, both in U. S. A.

270,857 Airless cushion tire. Alexander Bert Peters, Limoilou, Quebec.

270,876. Wall covering. James Herbert Stedman, Braintree, Massachusetts, U. S. A.

271,215 Solid tire. The Goodyear Tire & Rubber Co., assignee of Jorgen I. Haase, both of Akron, Ohio, U. S. A.

United Kingdom

267,186 Connecting uppers to insoles and soles. W. B. Wiegand, 64, Queen street North, Kitchener, Ontario, Canada, and P. Schidrowitz, 57, Chancery Lane, London.

267,404 Brushes and artificial furs. British Dyestuffs Corporation, 70, Spring Gardens, C. J. T. Cronshaw and W. J. S. Naunton, Crumpsall Vale Chemical Works, Blackley, both in Manchester.

267,522† Tire air tubes. Dunlop Rubber Co., Ltd., 32, Osnaburgh street, London.

268,386† Solid or cushion tire. Akt.-Ges. Der Eisen-Und Stahlwerke Vorm. G., Fischer, Schaffhausen, Switzerland.

† Not yet accepted.

Germany

444,038 Process and apparatus for closing rubber tubes. Marcel Zühlke, Belfortstrasse, 29, Berlin-Weissensee.

Designs

Germany

444,979 Equipment for producing rubber-covered conducting wires. Alfred Roth, Vienna. Represented by Dr. A. Mestern, Berlin S. W. 48.

Editor's Book Table

"United States Government Master Specification for Tires, Pneumatic and Solid Rubber, and Inner Tubes." Specification No. 3c, revised April 25, 1927, superseding F. S. B. Specification No. 3b. Published by the Federal Specifications Board.

THIS specification was officially promulgated on February 3, 1922, for the use of the departments and independent establishments of the government in the purchase of pneumatic and solid tires and inner tubes.

The latest date on which the technical requirements of this specification shall become mandatory for all departments and independent establishments of the government is July 25, 1927. They may be put into effect, however, at any earlier date, after promulgation.

"Monthly Labor Review—Volume XXIV, Number 1." Prepared by the Bureau of Labor Statistics. Published by Government Printing Office, Washington, D. C. Paper, 248 pages, 6 by 9 inches.

Among the six articles included in this issue of January, 1927, is one dealing with labor productivity in a number of important industries. Estimating labor productivity in rubber tire manufacture in 1914 at 100 per cent, the author of the bulletin in question finds a steady rise in percentage during the years following, the 1925 figure being 311 per cent. Other statistics include information regarding the number of employes in the American rubber industry and the wages paid them.

Achema-Jahrbuch, 1926-27. Reports on the condition and development in the field of chemical apparatus. Edited, with collaboration of colleagues in science and technics, by Dr. Max Buchner. Published by Chemie G. m. b. H., Berlin W. 10. Paper covers, 6 x 8¼ inches. 320 pages and 36 pages of inserts. Illustrations, indexes.

In connection with the fifth Achema exhibition of chemical apparatus and machinery held from June 7-19, 1927, at Essen, the Achema yearbook, 1926-1927 was distributed free of charge. The Achema exhibitions were founded in 1920 by Dr. Max Buchner and have proved very successful. The 1926-27 yearbook contains a number of articles on scientific and technical-industrial items including one on protective rubber linings for metal, from the technical department of the firm of Dr. Heinrich Traun & Söhne, Hamburg. There are a number of photos of leading chemical engineers and numerous illustrations of apparatus and machinery. A feature of the hand book is the interesting buyers' index with cross reference.

New Trade Publications

Laboratory Emergency Chart. Direction for procedure in case of laboratory accidents, poisoning or injury by corrosive chemicals, published by the Technical Service Department, Fisher Scientific Co., Pittsburgh, Pennsylvania.

This chart of directions covering the emergencies of accidental injury and poisoning to laboratory workers was prepared by the Staff Committee on Safety and Safeguards of the Department of Chemistry of the College of the City of New York, under the direction of Dr. Herbert R. Moody in cooperation with other medical authorities.

This collection of verified and valuable information is at the disposal of all laboratories prompted by humanitarian reasons to prevent suffering and save life. It is sent without charge to laboratories requesting it from the publisher.

"Worm Gears and Drives—Bulletin 'E'" is the title of a new illustrated catalog issued by the Fawcus Machine Co., Pittsburgh, Pennsylvania.

The Akron Standard Mold Co., Akron, Ohio, has prepared a useful tabulation, showing the tire and rim sizes used on this year's types of automobiles.

"Falk Speed Reducers" is the name of an illustrated publication issued as Bulletin 160 by The Falk Corporation, Milwaukee, Wisconsin.

"Stephens Products" is the title of the catalog now being issued by the A. J. Stephens Co., Fifteenth and Chestnut streets, Kansas City, Missouri. The organization manufactures inner tubes, fan belts, radiator hose, reliners, etc.

"The Tire Rate Book—April, 1927," as published quarterly by Edward Lyman Bill, Inc., 420 Lexington avenue, New York, N. Y., contains as usual important data of value not only to the tire dealer but to the tire manufacturer as well.

The Rubber Association of America, Inc., is publishing its twenty-seventh year book, this issue for 1927 including certain information of importance to the industry.

"Foreign Agency Agreements" is the title of a bulletin of nineteen pages, prepared by William G. Marvin, of Marvin and Bergh, general counsel of The American Manufacturers Foreign Credit Insurance Exchange. The pamphlet, which is published by American Foreign Credit Underwriters, Inc., 381 Fourth avenue, New York, N. Y., is intended to assist those who are doing business abroad through agents.

Abstracts of Recent Articles

GUTTA PERCHA AND ITS APPLICATIONS TO THE ELECTRICAL INDUSTRY. II., GENERAL UTILITY AND INSULATION.—A. Malarmey, *Rev. Gen. Caout.*, 1927, No. 29, 29-32.

SYNTHETIC RUBBER AND NATURAL RUBBER.—J. R. Katz and P. van Campen, *Chem. Zeit.*, 51, 53-4, 1927.

X-RAY STUDIES OF METASTYROL.—M. Hünemörder, *Kauts.*, 1927, 106-7.

HOW IS THE EXTENSIBILITY OF RUBBER EXPLAINED?—J. R. Katz, *Gum. Zeit.*, 41, 1459-60, 1927.

CONSIDERATIONS RELATING TO THE DRYING OF RUBBER.—J. D. Fry, *I. R. Jour.*, 73, 513-6, 1927.

THE ALTERATION OF RAW AND VULCANIZED RUBBER AND AGING TESTS. Review.—J. Ch. Bongrand, *Rev. Gen. Caout.*, 1927, No. 30, 9-12.

THE AGING PROPERTIES OF RAW AND VULCANIZED RUBBER. Research on the effect of the non-rubber compounds in raw rubber on its aging.—G. Martin, *Trans. Inst. Rubber Indus.*, 2, 354-80, 1927.

THE COMMERCIAL POSSIBILITIES OF THE ANODE PROCESS.—J. W. Schade, *Rubber Age*, N. Y., 21, 79-80, 84, 1927.

A VOLATILE OXIDATION PRODUCT OF BALATA.—T. R. Dawson and B. D. Porritt, *Trans. Inst. Rubber Indus.*, 2, 345-53, 1927.

RUBBER SOLVENTS.—D. F. Twiss, *Trans. Inst. Rubber Indus.*, 2, 381-408, 1927.

A NEW LIGHT EFFECT IN THE SYSTEM RUBBER-SULPHUR.—H. Pohle, *Naturwissenschaften*, 15, 162-3, 1927.

THE LABORATORY IN THE RUBBER INDUSTRY. Its field of usefulness and organization.—R. L. Dupont, *Rev. Gen. Mat. Plastiques*, 3, 110-3, 1927.

MAGNESIUM CARBONATE AND THE TRANSPARENCY OF VULCANIZED RUBBER.—Y. Tanaka, *Trans. Inst. Rubber Indus.*, 2, 330-44, 1927.

COAGULATION PHENOMENA IN HEVEA LATEX IV. Latex in the second liquid zone.—O. de Vries and N. Beumée Nieuwland, *Comm. Neth. Rubber Testing Station*, 1927, No. 6, 503-565.

CHANGES IN SLAB RUBBER ON KEEPING.—W. Spoon, *Comm. Neth. Rubber Testing Station*, 1927, No. 9, 67-73.

INFLUENCE OF "USPULUN" ON THE INNER PROPERTIES OF RUBBER. W. Spoon, *Comm. Neth. Rubber Testing Station*, 1927, No. 10, 74-78.

RECLAIMED RUBBER. Parts 4 and 5.—C. E. Bishop, *Rubber Age*, N. Y., May 25, 1927, 189-90, June 10, 247-8.

SECONDARY LEAF FALL DISEASE OF RUBBER. Investigations into methods of preparing Bordeaux and Burgundy spraying mixtures. —Rubber Specialist, U. P. A. S. I. (United Planters' Association of South India), *Planters' Chronicle*, February 26, 1927, 115-126.

SOME REMARKS ABOUT THE PRESERVATION OF FRESH FRUIT WITH LATEX.—W. Spoon, *Rubber Age*, London, June, 1927, pp. 157-159.

ESTATE PRACTICE IN THE COLLECTION AND CURING OF PLANTATION RUBBER.—F. W. G. Rippon, *Rubber Age*, London, June, 1927, pp. 164-166.

CADMIUM COLORS FOR RUBBER MANUFACTURE. Cadmium sulphide and cadmium lithopone, preparation of the latter.—H. W. D. Ward, *Rubber Age*, London, pp. 171-172.

EBONITE MANUFACTURE. Part I. Ingredients and Their Preparation. Part II, Ebonite Sheets. Part III, Ebonite Rods.—R. M. Ungar, *I. R. Jour.*, May 21 and 28, June 4, 1927, pp. 839-41, 881-2, 911-23.

BARYTES AND ITS EMPLOYMENT IN THE RUBBER INDUSTRY. Research Report No. 8 of the British Rubber & Tyre Association. Covers the general nature of the material, sources, preparation, evaluation, chemical and physical examination.—T. R. Dawson and N. H. Hartshorne, *I. R. Jour.*, May 28 and June 4, 1927, pp. 885-889; 926-930. Charts and Tables.

VULCANIZING EBONITE AT LOW TEMPERATURES. Patent specifications.—H. P. Stevens, *I. R. Jour.*, June 4, 1927, p. 923.

INFLUENCE OF BUTALDEHYDE-AMMONIA IN VULCANIZATION.—C. A. Hallas and T. J. Drakeley, *J. Soc. Chem. Indus.*, 1927, 46, pp. 178-179. T.

WHAT SHOULD THE OWNER OF MOTOR VEHICLES KNOW ABOUT RUBBER?—B. Meyer Berkhout, *Das Last Auto*, February, 1927, pp. 6-8.

STUDIES ON HEVEA LATEX. VI. The Proteins in Serum from Frozen Latex.—O. Bishop, *Malay. Agri. Jour.*, February, 1927, pp. 27-34. Tables.

FURTHER WORK ON TREATMENT OF WETROOT ROT.—A. Sharples. *Malay. Agri. Jour.*, February, 1927, pp. 35-40. Tables.

RESEARCHES ON THE NATURE OF MATURED RUBBER. Note II.—G. Bruni and T. G. Levi, *Gior. Chem. Ind. App.*, April, 1927, pp. 161-164.

COMMUNICATIONS OF PRACTICAL VALUE. Latex strainers.—Dr. R. Riebl, *Archief*, April, 1927, pp. 107-111. Illustrated.

RUBBER FROM BUDDED TREES. II. Investigation of latex and rubber.—O. de Vries and W. Spoon, *Archief*, April, 1927, pp. 112-145. Tables. English summary, pp. 146-49.

LATEX AND RUBBER FROM YOUNG TREES. Dr. R. Rieble.—*Archief*, April, 1927, pp. 155-165. English summary, pp. 166-168. Tables.

THE PROPORTION OF SULPHUR IN RUBBER. A new oxidizing mixing.—Ernest Kahane, *Le Caout.*, May 15, 1927, pp. 13549-13550.

RUBBER IN FRENCH WEST AFRICA. *Le Caout.*, May 15, 1927, pp. 13553-13554.

NATURAL IMMUNITY OF RUBBER TREES TO BARK ROT.—R. H. Stoughton-Harris, *Trop. Agri.*, March, 1927, pp. 143-145. Table.

ON THE APPLICATION OF LATEX IN THE FOOTWEAR INDUSTRY.—Ernst A. Hauser, *Gum.-Zeit.*, April 29, 1927, pp. 1750-1751.

SHIMMYING OF FRONT WHEELS IN MOTOR VEHICLES.—*Gum.-Zeit.*, May 16, 1927, p. 1866. Illustrated. Abstracted from article by Alfred Kauffmann in *Der Motorwagen*, Nos. 8 and 9.

SINCE 1922 THERE HAS BEEN AN INCREASE OF NEARLY A MILLION yearly in the number of automobile casings exported from the leading manufacturing countries of the world. The combined totals, according to the Department of Commerce, are as follows: (1922), 3,839,000 casings; (1923), 4,699,000; (1924), 5,131,000; (1925), 6,777,000; and (1926) 6,890,000. France remains in the lead, with shipments for 1926 of approximately 1,902,000 casings followed by the United States, with 1,654,000.

Eminent Crude Rubber Chemist

Dr. Henry Potter Stevens, consulting chemist to the British Rubber Growers' Association and technical adviser to the Propaganda Committee of the same association, conceded to be one of the foremost crude rubber chemists in the industry, was born in London, England, in 1875. He was graduated from St. John's College, Oxford, and the Universities of Strassburg, Alsace and Bonn and Heidelberg, Germany. His master's degree was conferred at Oxford and his doctorate at Heidelberg. For nearly 25 years Dr. Stevens has been continuously identified both in London and on several visits to the Far East with the solution of the numerous scientific and technical problems concerning latex, coagulation and the preparation of crude rubber.

H. P. Stevens, Ph. D.

Dr. Stevens' published works on these and related topics of crude rubber technology are numerous and deal practically with every phase of this complicated subject, including variability and studies in vulcanization. A few only of his contributions to the knowledge of latex plantation rubber preparation and the industrial uses of rubber can here be cited. They are found in the files of the *Bulletin of the Rubber Growers' Association* and various British and Continental scientific journals.

Of two score or more papers that have appeared within the past ten years mention may be made of Aging Tests on Rubber Coagulated with Acetic Acid and Paranitrophenol; Sodium Silicofluoride for Coagulating Rubber; Latex Globules; Tests of Dinitrophenol in the Preparation of Crepe and Smoked Sheet Rubber; Aging Tests of Fine Para and Smoked Sheets; Plantation Rubber Vulcanized with Organic Accelerators; Resistance of Pigmented Crepe Rubber to Atmospheric Influences, Particularly Sunlight; several communications on sprayed rubber; and Reports on the Use of Sodium Bisulphide in Making Light First Latex Crepe.

Dr. Stevens compiled the section relating to rubber in the first annual report on the progress of applied chemistry issued in 1917 by the Society of Chemical Industry. He was also joint author of *The Rubber Industry*, the official report of the proceedings of the International Rubber Congress, London, 1911. At the Symposium on Raw Rubber held at the Philadelphia meeting of the American Chemical Society, he contributed a paper, Recent Developments in the Preparation of Plantation Rubber.

Dr. Stevens is a fellow in the following London scientific bodies: Institute of Chemistry, Society of Chemical Industry, Public Analysts, and fellow and member of Council of the Institution of the Rubber Industry.

IMPORTS INTO THE UNITED STATES OF CRUDE RUBBER, INCLUDING latex, have declined both in quantity and value during the first quarter of 1927, according to statistics published by the Department of Commerce in "Our World Trade." The quantity comparison, with 240,110,000 pounds for the 1927 period and 263,025,000 for the first quarter of 1926 indicates a loss of 8.7 per cent, while the corresponding values are $88,557,000 and $201,851,000 respectively, or a decline of 56.1 per cent. The average import price per pound of crude rubber dropped from $0.767 last year to $0.368 this year.

GERMANY'S IMPORTATIONS OF AMERICAN-MADE TIRES AND TUBES showed a great increase during 1926, the following being the total values for the past four years: 1923, $58,572; 1924, $36,452; 1925, $348,735, and 1926, $1,819,243.

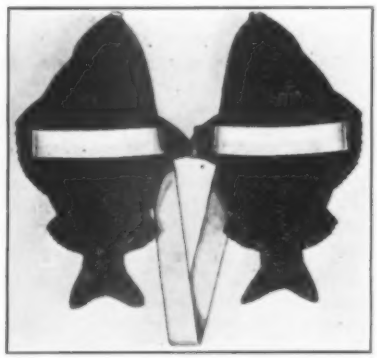
New Goods and Specialties

Bathing Devices from Kleinert

Bag with Movable Eyes

The rubber bag is recognized as a necessity for wet bathing suits and towels, but where hitherto these bags were more useful than attractive, the various styles now displayed are formidable rivals of the more perishable silk and satin models. A particularly pretty design is here illustrated, commodious enough to accommodate whatever necessities are required, and easily carried over the arm. The roguish face with moving eyes conforms to the present fad for this type of ornamentation.

A float which will be sure to delight the



Fish Float

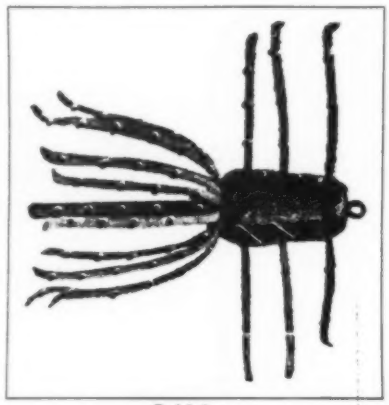
heart of the kiddies because of its appropriate fish design, will soon teach them to keep afloat and lose all fear of deep water. The mouth is fitted with a white valve to hold the air in when the fish is inflated. A belt holds the two fish together and is adjusted to the size of the bather.—I. B. Kleinert Rubber Co., 485 Fifth avenue, New York, N. Y.

Golf Ball Cleaner

A white powdered material which in no way injures the ball or surface but cleans it a snowy white has found its way to favor among clubs and golf fans. It is so strong that only a few grains to a glass of water are necessary. The ball is dropped into this solution and revolved a few times, then brought out and wiped dry. It cleans like new paint, instantly and without effort.—The Vaporine Co., 179 North Wells street, Chicago, Illinois.

Bass and Trout Lure

Simulating the movements and life-like motions of a struggling or swimming insect, Spidalure, its manufacturer claims, will induce strikes when all other lures, including live bait, fail. The body is made of cork and the legs and fan-like tail of

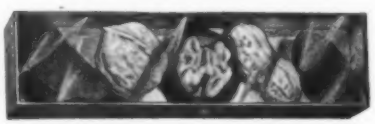


Spidalure

small rubber bands. The hook extends through the cork body, its long shank cleverly concealed by a tube covering striped to correspond to the color markings on the body. Spidalure may be used either dry or with a spinner.—C. W. Wynn, Selma, Alabama.

Sponge Rubber Dainties

So tempting and exact a reproduction of the genuine article are these sponge rubber chocolates and nuts that the joker may easily fool himself by mixing them in a plate of real candy. They are packed in a decorated box and will create no end of fun at a social gathering. The assortment includes English walnuts, Brazil nuts,



Assorted Chocolates and Nuts

pecans, peanuts and a varied line of the chocolates. The manufacturer is The Faultless Rubber Co., Ashland, Ohio.

Combination Toy and Float

A cunning little poodle dog which may amuse the youngsters on land, and also be taken into the water to act as a float, is the pictured Poodley Woodley, a member of the Air Line created by Lady Edison.

Poodley Woodley

The dog weighs only 16 ounces and a patented valve and bulb in the tail is used to both inflate and deflate it. Fur cloth is used as a covering, the stomach packed with scraps, and the legs made of balsa wood. However wet the puppy may become a thorough drying and shaking will soon restore him to his normal fluffy state. —Averill Manufacturing Co., New York, N. Y.

Tire Equipment for Aircraft

What is believed to be the largest and the smallest tires ever built for aircraft

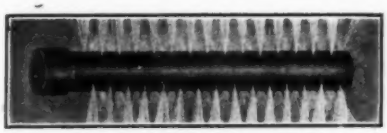
Large and Small Aircraft Tires

use are shown in the accompanying illustration. The large tire, a 64 by 14-inch Silvertown, is the largest pneumatic tire ever built and will sustain a load of 12,000 pounds when inflated to a pressure of 75 pounds. The tire with wheel assembly weighs approximately 300 pounds. It was built for a special government plane designed to carry excessively large loads.

The small tire is the smallest member of the Silvertown family, being 18 by 3 inches, and was recently brought out to meet the growing demand for light plane tire equipment.—The B. F. Goodrich Co., Akron, Ohio.

Lawn and Garden Spray

A new type of lawn and garden spray, said to be the only one ever made of hard rubber, fits any size garden hose, and works



Hard Rubber Spray

as efficiently as the best metal spray. It is made in two styles: one with three series of holes on one side only, designed to be held in the hand or placed upon the ground, throwing the spray upward and to the right and left. Another style has the holes arranged spirally and is designed to be held upright on a wire stand or elbow, throwing the spray about twelve feet in each direction thus covering a circle of twenty-four feet in diameter.—Wishart Rubber Co., Trenton, New Jersey.

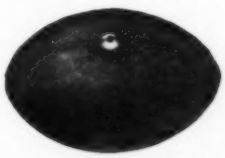
Polished Rubber Pen and Pencil

Wahl Pen

Eversharp Pencil

Rubber has proved itself an adaptable and serviceable ally of pen and pencil manufacturers and has found its way into the pockets of every man the world around. The latest models illustrated here show what can be done with rubber to beautify these articles. Intricate designs such as the Grecian border figure are cut into the rubber by diamond cutters, the beauty of which is further enhanced by the high polish and smooth finish. Narrow gold-filled bands around the lower end of the pen cap and the bottom of the pencil barrel are admirably adapted to the rubber, and the rose-wood model, made also of rubber, closely resembles that famous wood.—The Wahl Co., 1800 Roscoe street, Chicago, Illinois.

Football Bladder with Metal Valve



Stemless Football Bladder

An innovation for the coming football season will be the adoption by sporting goods manufacturers of the stemless bladder (with metal valve) on all footballs, even the medium priced. A full line of these bladders is manufactured by The Seamless Rubber Co., New Haven, Connecticut, for football, basketball, soccer and volley ball. A patented metal valve, vulcanized in place, is used and has proven an overwhelming success.

Valve Cap

The improved No. 880 valve cap, manufactured by A. Schrader's Son, Inc., 470 Vanderbilt avenue, Brooklyn, New York, has a reinforced, dome-shaped, rubber

Improved Cap

washer which forms an absolutely air tight seal at the mouth of the valve stem. This valve cap is guaranteed air tight up to 250 pounds, when it is screwed down tight by hand. The illustration shows the cap subjected to the "water test."

Attractive Bag for the Beach

Another novelty recently designed by Lady Edison is a bathing bag which contains two separate compartments: one for dry, and one for wet clothing, with a vanity case in the center to hold powder, rouge, cigarettes and handkerchief. The bag is made of rubberized material and wired around the edge to hold its shape, a contrasting color furnishing the trimming. An attractively colored face, with coiffure of white hair, adorns one side of the bag and on the other a daisy of the contrasting color. A loop at the top may be slipped

Bathing Bag

over the arm, a clasp holding it secure.—E. A. Guinzburg, 302 Fifth avenue, New York, N. Y.

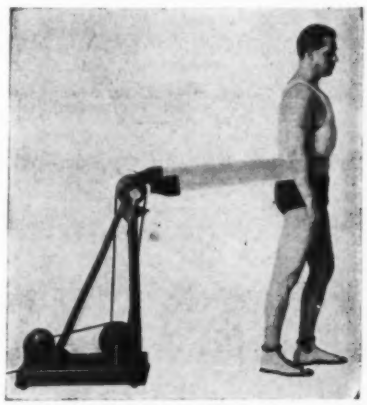
Bathing Shoe from Germany

Bathing shoes of colored or patterned crêpe or sheet rubber in many bright colors are offered by Gummi - Werke "Elbe" Akt.-Gesellschaft Klein-Wittenberg (Elbe), Germany. In addition to the all-rubber shoe, another style is of fabric with rubber soles which may also be obtained in a variety of colorful and effective combinations.

Elbit Shoe

A Simple Form of Exercise

The busy man or woman of today finds little time for the exercise needed to keep the body in perfect physical health. The Daley exerciser is a simple and easy way of obtaining this regular exercise and will, so the manufacturer claims, accomplish amazing results in a short time. It is a compact, sturdy machine and takes up about as much room as a chair. The entire body from head to foot may be exercised or massaged, the user selecting the most



Daley Exerciser

desirable positions applicable to his own needs. It is only necessary to adjust the belt, touch the button, and let the machine do all the work.—Health Equipment Manufacturing Co., 5716 Euclid avenue, Cleveland, Ohio.

Marmon Eight Employs Rubber Knuckles

Sharp road shocks and so-called spring periods are fully guarded against in the new little Marmon Eight by the use of rubber knuckles in place of shackles in the springs. Not only do the knuckles increase the car's riding comfort, but they also obviate the necessity for lubricating spring shackles. A metal housing completely covers each rubber knuckle and gives it protection from water, grease, oil and dirt, thus insuring its resiliency during the life of the car.

Financial and Corporate News

New Incorporations

COLVIN & SERVIS, INC., May 17, 1927 (Pennsylvania), capital $125,000. Principal office 6 Ross street, Rahway, New Jersey. Incorporators: Arthur R. Colvin and Frank W. Servis, both of Trenton; and William McCollum, Rahway, both in New Jersey. To manufacture and deal in rubber, gutta percha, etc.

THE FEIN MANUFACTURING CORPORATION, May 4, 1927 (Massachusetts), capital $22,500 preferred stock and 100 shares common stock without par value. Incorporators: Samuel L. Fein, 130 Leyfred Terrace; Irving Fein, 508 Central street; and Dora Brisk, 30 Leete street, all of Springfield, Massachusetts. Principal office, Springfield, Massachusetts. To deal in wool, cotton, rubber, etc., and to manufacture cloth, clothing, garments and wearing apparel.

GOODYEAR SUNDRIES & MECHANICAL CO., June 11, 1927 (New York). Incorporators: F. V. Stroming, 134 Duane street; Henry H. Haire, 110 William street, and Edward C. Schiffmacher, 110 William street, all of New York. Principal office, 116 Chambers street, New York, N. Y. To manufacture, buy and sell full line of rubber sundries, clothing and mechanical goods.

INTERSTATE TILE & RUBBER CO., INC., May 6, 1927 (New Jersey), capital stock $5,000, divided into 50 shares of $100 par value each. Principal office, 12 Beaver street, Newark, New Jersey. Incorporators: Joseph Lella, Colonia; Joseph Hanley, 31 Cross street, West Orange; Joseph M. McAndrews, Colonia, all in New Jersey. To deal in floor coverings, automobile accessories, etc.

MID-WEST TIRE CO., April 11, 1927 (Kentucky), capital stock $5,000, divided into 50 shares of $100 par value each. Incorporators: Otto and Ross Slote, both of Louisville, Kentucky, and George Ades, Anderson, Indiana. Principal office, Louisville, Kentucky. To operate a general retail and wholesale tire and accessories company.

MOLDED HOSE & RUBBER CO., April 18, 1927 (Pennsylvania), capital stock $5,000, divided into 100 shares of par value of $50 each. Principal office, Pittsburgh, Pennsylvania. Incorporators: Frank W. Succop, Waldheim Road, Aspinwall; William Duncan, 252 Highlands avenue, Ben Avon; and Archie J. Ziegler, 1503 East street, Pittsburgh, all of Pennsylvania.

NEW JERSEY TIRE PATCH CO., May 13, 1927 (New Jersey), capital stock of 100 shares without par value. Principal office, 1060 Broad street, Newark, New Jersey. Incorporators: Frank Myers, Stanley Bratan and Benjamin D. Braelow, all of Newark, New Jersey. To repair, patch and vulcanize tires and inner tubes.

PARAGON SERVICE, INC., May 4, 1927 (New Jersey), capital stock $100,000. Principal office, 817-819 Springfield avenue, Irvington, New Jersey. Incorporators: Herbert Kruttschnitt, 11 Brighton Terrace; Gustav A. Kruttschnitt, Jr., 962 Grove street; and Gustav A. Kruttschnitt, Sr., 43 Harrison Place, all in Irvington, New Jersey. To deal in automobile tires, tubes, etc.

STANDARD TIRE & RUBBER CO. OF SPRINGFIELD, March 19, 1927 (Massachusetts), capital 1,000 shares without par value. Principal office, Springfield, Massachusetts. Incorporators: Sidney H. Kohn, 31 Elm street, Springfield; George A. Morin, 185 Devonshire street, Boston; and Abraham Chiz, Springfield, all in Massachusetts. To buy, sell, deal in and manufacture solid and pneumatic tires for automobiles and other vehicles, etc.

THE TIRE SERVICE CO., June 10, 1927 (Delaware), capital stock $5,000, divided into 50 shares, par value $100. Principal office, care Corporation Trust Co. of America, duPont Building, Wilmington, Delaware.

VICTOR PUNCTURE-PROOF TIRE CO., INC., June 3, 1927 (Delaware), capital stock $250,000, divided into 25,000 shares, par value $10. Principal office, care United States Corporation Co., Dover, Delaware.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Aetna Rubber Co.	Com.	$0.25 q.	July 1	June 15
Aetna Rubber Co.	Pfd.	1¾% q.	July 1	June 15
Faultless Rubber Co.	Com.	$0.50 q.	July 1	June 16
Faultless Rubber Co.	Pfd.	1¾% q.	July 1	June 16
Firestone Tire & Rubber Co.	Com.	$1.50 q.	July 20	July 10
Firestone Tire & Rubber Co.	6% Pfd.	$1.50 q.	July 15	July 1
Firestone Tire & Rubber Co.	7% Pfd.	$1.75 q.	Aug. 15	Aug. 1
General Tire & Rubber Co.	Pfd.	1¾% q.	July 1	June 20
Goodyear Textile Mills Co.	Pfd.	1¾% q.	July 1	.....
Goodyear Tire & Rubber Co. of California	Pfd.	1¾% q.	July 1	.....
Goodyear Tire & Rubber Co. of Canada	Pfd.	1¾% q.	July 2	June 15
Hood Rubber Co.	Com.	1¾% q.	July 15	June 25
India Tire & Rubber Co.	Com.	$0.45 q.	July 1	June 20
India Tire & Rubber Co.	Pfd.	$1.75 q.	July 1	June 20
Intercontinental Rubber Co.	Com.	$0.25 q.	June 30	June 18
Overman Cushion Tire Co., Inc.	Pfd.	$1.75 q.	July 1	.....
Overman Cushion Tire Co., Inc.	"A" Com.	$0.375	July 1	June 24
Overman Cushion Tire Co., Inc.	"B" Com.	$0.375	July 1	June 24

DURING THE CALENDAR YEAR 1926 FRANCE EXPORTED RUBBER footwear to the amount of 3,623,200 kilos, gross weight, as compared with 3,110,200 gross kilos in 1925. The United Kingdom was easily the best market in 1926, taking 986,000 kilos, other good customers being Belgium and Luxemburg, Egypt, Syria, Italy, and Switzerland.

Akron Rubber Stock Quotations

Quotations of June 21, supplied by Otis & Co., Cleveland, Ohio

Company	Last Sale	Bid	Asked
Aetna com.	19	18	19
Aetna pfd.	95	...	...
Falls com.	6½	...	6½
Falls pfd.	12	8	...
Faultless com.	43¼	43⅜	44
Firestone com.	141	140	141
Firestone 1st pfd.	106¼	106¼	107
Firestone 2nd pfd.	103¼	103	103½
General com.	145	...	160
General pfd.	102½	...	110½
Goodrich pfd.	100	...	...
Goodyear com. V. T. C.	51½	...	...
Goodyear pfd. V. T. C.	115½	...	...
Goodyear pr. pfd. V. T. C.	111⅜	...	...
India com.	23½	22	24
Miller com.	34	...	...
Miller pfd.	101	100	101
Mohawk com.	15	...	...
Mohawk pfd.	40	...	...
Rubber Service Laboratories	32	32	35
Seiberling com.	25	24¼	25
Seiberling pfd.	108⅛	98½	...
Star com.	2	...	2

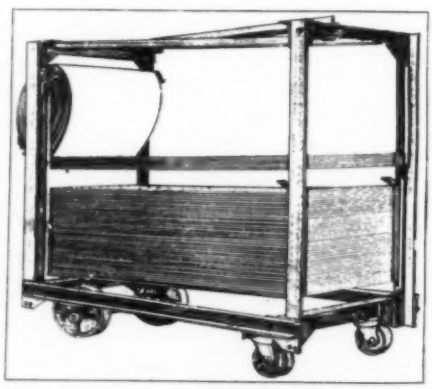
New York Stock Exchange Quotations

June 22, 1927

	High	Low	Last
Ajax Rubber, com.	8⅛	8⅛	8⅛
Fisk Rubber, com.	15⅞	15¼	15⅝
Fisk Rubber, 1st pfd. (7)	85	85	85
Goodrich, B. F., Co. (4) com.	54⅜	54	54
Goodrich, B. F., Co. pfd. (7)	99	99	99
Goodyear Tire & Rubber pfd. (7)	113¼	113⅛	113⅛
Goodyear Tire & Rubber pr. pfd. (8)	109⅞	109¾	109¾
Intercontinental Rubber, com. (1)	12⅛	12⅛	12⅛
Kelly-Springfield Tire, com.	24	23	23
Keystone Tire & Rubber, com.	½	½	½
Lee Rubber & Tire, com.	8⅛	8	8
Miller Rubber, com. (2)	32¾	32¾	32¾
Norwalk Tire & Rubber, com.	3⅛	3	3
United States Rubber, com.	41¼	40¼	40½
United States Rubber 1st pfd. (8)	90¼	89¼	89¾

SHOE SOLE STOCK RACK

The long established method of handling soling stock from the calender to the cutting machine was to lay the material in short lengths on thin wooden boards cleated on the same side at both ends. A pile of detached sole boards was thus built up on a low platform truck and transported to the cutting department. This system involved frequent repairs for the upkeep of the stock boards at considerable expense.



Economic Standard Leaf Truck

A greatly improved method is that in which a leaf truck is used. This form of truck is here pictured. It is built of steel channels supported on two roller bearing wheels at one end and two roller and ball bearing swivel casters at the other. The top of the truck frame is diagonally braced with steel angles. The capacity of this truck is 100 duck leaves. These are located at one end of the truck and are supported and guided by angles ready for laying on the successive cuts of stock as they come from the calender.

This device has much greater capacity than any ordinary form of truck.—Economic Steel Rack Co., Everett, Massachusetts.

The Rubber Industry in America

Ohio

A slight recession in tire manufacturing occurred early in June, largely due to cool and unseasonable weather in most parts of the country, which has retarded motoring. Sales of tires fell off to some extent, after excellent business in the earlier months of the year. Akron manufacturers believe, however, that a few weeks of hot weather would quickly bring about a wave of buying in the retail tire trade.

Sales of tennis shoes and golf balls have been satisfactory, it is reported, although not as heavy as had been expected. The weather, too, has been an unfavorable factor in these lines.

Total automobile tire production in the Akron district is above 140,000 a day, still above the output at this time last year. The Goodyear Tire & Rubber Co.'s Akron plant is turning out about 45,000 tires a day, Goodrich approximately 38,000, Firestone about 43,000 and Miller around 8,000. Seiberling, General, India and Mohawk are reported operating close to capacity.

Equipment is being installed in the new addition to Firestone Plant 2. This will increase the capacity by 5,000 tires a day. A new addition is also being planned by the General Tire & Rubber Co.

Despite the recent break of over five cents a pound in the crude rubber market, manufacturers deny they are planning any tire price reductions at this time. Whether such action is taken later is problematical.

Dr. W. C. Geer, former vice president of The B. F. Goodrich Co., headed a group of members of the American Institute of Chemical Engineering on a visit to the Goodrich plant in Akron, June 2. The visiting engineers were entertained at luncheon, addresses being made by Dr. Geer, H. F. Fritz, and J. D. Tew, works manager.

Gates Ferguson, well known in advertising circles as a former president of the Advertising Club of Minneapolis and a vice president of the International Advertising Association, is now national advertising manager of The B. F. Goodrich Co., of Akron. He was formerly advertising service manager of the Blanchard Press, Inc.

Lee Young of the Goodyear Tire & Rubber Co., recently left Akron to join the company's new organization in Australia.

Edward Lyman Bill, Inc., publisher of *Tires,* has appointed Walker & Walker as its exclusive publishers' representative in Ohio, with offices in the Akron Savings & Loan Building, Akron, Ohio. Ross F. Walker, treasurer of the new concern, is a veteran newspaper publisher, while R. Foster Walker, his son, will devote his time exclusively to the interests of *Tires.*

The Lancaster Tire & Rubber Co., with factory at Lancaster, Ohio, is operating a chain store system in the Rocky Mountain territory with headquarters at 1569 Broadway, Denver, Colorado. Establishments for the handling of Lancaster tires are at present being maintained at Pueblo, Colorado, and Casper and Cheyenne, Wyoming, while plans are under consideration for the opening of branch stores in the outlying districts of Denver as well as in practically all the important towns of the state. The company's general offices are in Columbus, Ohio.

Harry L. Corbett, formerly connected in various sales capacities with the India Tire & Rubber Co., has just been appointed divisional sales manager for the Mohawk Rubber Co.

Laursen Royalties Suit

Henry L. Lowe, of Eau Claire, Wisconsin, has won his suit in the United States District Court at Cleveland to obtain a one-fifth interest in royalties accruing from the use by various rubber companies of the Laursen "water cure" process. According to the decision June 10 of Federal Judge D. C. Westenhaver, L. A. Laursen, the inventor, of Eau Claire and Akron, Ohio, must pay this share of the total revenues, estimated to be $5,000 a week, to Lowe, who was associated with him at one time. Lowe's suit, filed last January, was based on an agreement entered into by Lowe and Laursen in 1924, when Laursen, then with the Gillette Rubber Co., of Eau Claire, Wisconsin, perfected the water cure process. Lowe claimed he was to receive one-fifth of the royalties in return for selling the process to the rubber companies. Goodrich, Goodyear, Seiberling, Ajax and other tire companies are using the process. Total royalties paid by licensees will amount to nearly $5,000,000, it is estimated.

The Cleveland Equipment & Engineering Co. has moved its main offices from the Swetland Building to 6306-6310 Kinsman Road, Cleveland, Ohio. The new location provides not only better office and show room facilities but also

H. D. Andress

warehouse accommodations consisting of 10,000 square feet. The Cleveland organization specializes in rubber and textile equipment, hydraulic and power tools. It also appraises and liquidates industrial plants of all kinds. H. D. Andress, the company's president, a well-known figure in the industrial world, has specialized in rubber equipment since the year 1912, while during the World War he was connected with the Ordnance Department as a special representative.

The National Tire & Rubber Co. is installing new machinery which will practically double the vulcanizing capacity of its plant at East Palestine, Ohio. A production of 2,500 tires a day will be reached late in June it is stated by the management.

The Mason Tire & Rubber Co., Kent, Ohio, reports that John McKee, Jr., has been placed in charge of the company's branch at Cleveland, Ohio, succeeding Henry Cassel, resigned. Mr. McKee was formerly in charge of the Mason branch at Dallas, Texas.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, has just completed an order for the United States Government, the shipment including four hundred 32 by 6 airplane tires. In the construction of these tires, as well as similar ones produced during the war, the cord fabric used was found adequate for either airplane or automobile casings. John A. MacMillen is president and general manager of the Dayton company.

The Eclat Rubber Co., Cuyahoga Falls, Ohio, manufacturer of tubing machine products and rubber specialties, is now making Gumshu cord tires in two sizes only, 30 by 3½ and 29 by 4.40.

R. C. Gunther has been appointed factory manager of the Mohawk Rubber Co., Akron, Ohio. His previous connections with the rubber industry include six years of work as factory superintendent of the Inland Rubber Co. and later two years with the McKone Tire & Rubber Co. as superintendent of production.

The Wilcox Machine Co., Ravenna, Ohio, which specializes in experimental and repair work, has designed and built a number of machines used in the manufacture of such articles as toy balloons, nipples, fountain pen sacs, pouches, etc. C. F. Wilcox is general manager.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, specializing in the production of Dayton Thorobred and Stabilized balloon tires, reports an increase in sales for the first quarter of 1927 of 275 per cent, as compared with corresponding three months of 1926. S. F. La Chance has been appointed assistant to D. W. Warden, vice president, his particular duties including credits and collections.

Akron Rubber Reclaiming Co. sales for the first five months of 1927 totaled $638,803, an increase in volume over 1926 of 55 per cent, it is announced by President B. O. Etling. Net earnings were $83,972.25. At the directors' meeting June 22, it was voted to pay a regular quarterly dividend of $2 on the preferred stock and 50 cents a share on the common stock, payable July 15 to stockholders of record July 5. Shares of the company will be listed on the Cleveland stock exchange. Directors also authorized the purchase of additional equipment, which will enable the company to increase its output to 30 tons of reclaims a day. The concern was founded in 1923 by prominent men in the rubber industry who recognized the need for additional reclaimed product. F. A. Seiberling, pioneer rubber manufacturer, and William Welch, vice president and sales manager, sponsored launching the firm.

Dr. W. J. Kelly, secretary for four years of the Akron Section, American Chemical Society, has resigned his position in the chemical research department of the Goodyear Tire & Rubber Co., Akron, Ohio. He has removed to Philadelphia to engage in laboratory work. Dr. Kelly was with Goodyear about nine years, and is well known in the industry for his researches on vulcanization.

John J. Shea, treasurer of the Firestone Tire & Rubber Co., Akron, Ohio, celebrated on June 28 his twentieth year of service with the company. The first job he had with Firestone was operating an adding machine in the accounting department, where about four or five persons were employed. Promotions followed as the company grew and he served as assistant cashier, paymaster, general bookkeeper, assistant auditor and eventually auditor. In January, 1923, he was made treasurer of the Firestone company.

The India Tire & Rubber Co., Akron, Ohio, has reduced the quarterly dividend on common stock from 62½ cents to 45 cents to conserve funds for expansion purposes. President J. M. Alderfer announced that net earnings in the first four months of this year were $141,240, equivalent to $1.70 a share on the common. Sales totaled $2,227,352, compared with $1,340,135 in the same period of 1926. The company recently sold $300,000 additional common stock to increase working capital.

Grubb Rubber Co. Organized

The Grubb Rubber Co. is a new organization, with manufacturing plant and factory offices located at Wadsworth, Ohio, a suburb of Akron. It has been established by D. A. Grubb, president and general manager, who was formerly one of the organizers of the India Tire & Rubber Co., and directed its sales until a few months ago, when he disposed of his interests in that concern.

The Grubb Company's modern plant at Wadsworth is well equipped with new machinery, the factory building itself being a two-story structure, with 37,000 square feet of floor space. The products will include "Flint" tires, made in two sizes, inner tubes, repair materials, as well as a varied line of mechanical rubber goods, such as men's rubber belts, rubber floor mats, etc.

Associated with Mr. Grubb are the following officials: W. E. Griesinger, vice president; R. M. Sanderson, production superintendent; H. C. Allyn, secretary; and Frank E. Lytle, treasurer.

TIRE DUCK EXPORTS

March exports by American manufacturers of cotton duck and tire fabrics reached a total value for the month of $453,693, according to statistics prepared by the Department of Commerce. Of these shipments 175,000 square yards consisted of tire fabrics, 1,153,000 square yards represented unbleached cotton duck, 147,000 square yards bleached cotton duck, and 99,400 colored cotton duck.

New York

The New Jersey Zinc Co., 160 Front street, New York, N. Y., has made certain changes in its executive personnel, the revised list being as follows: Edgar Palmer, chairman of the board; James E. Hayes, president; A. P. Cobb, vice president; F. N. Spencer, vice president; H. S. Wardner, treasurer; and A. P. Cobb, secretary.

The United States Rubber Co., 1790 Broadway, New York, N. Y., has enlarged its offices by the purchase of a two-story building at 232 West 58th street, New York, N. Y.

The American Hard Rubber Co., 11 Mercer street, New York, N. Y., announces that A. P. House has been appointed as the company's purchasing agent, succeeding F. W. Lingley.

The Leonard R. Fellerman Co., 258 Broadway, New York, N. Y., is a manufacturers' representative of sporting goods, one of the lines carried including the "Marpage" brand of supporters and elastic goods, as manufactured by the Martin-Page Co., Middlesboro, Kentucky. Other products handled are the golf balls made by the Worthington Ball Co., Elyria, Ohio.

E. B. Filsinger, export manager of Lawrence & Co., New York, N. Y., selling agents for some of the country's largest cotton mills, was elected president of the Export Managers' Club of New York, at its annual meeting held June 14 at the Hotel Pennsylvania. Mr. Filsinger is a well-known figure in export trading circles, and is a member of many important committees. He is the author of various books on exporting, including "Exporting to Latin America," "Commercial Travelers' Guide to Latin America," and others.

J. H. Linxweiler, formerly associated with the Norwalk Tire & Rubber Co., is now sales manager of the Continental Rubber Co., whose new offices are at 1775 Broadway, New York, N. Y. The Continental organization is the leading distributer of guayule rubber.

The San-It Rubber Co., Inc., Pierce and Ninth avenues, Long Island City, New York, is carrying on business as a proofer for the trade and a manufacturer of rubber novelties.

The Star Rubber Co., Akron, Ohio, announces that R. C. Hill has been appointed as the company's branch manager at Buffalo, New York, while B. J. Meyers will take over the Central New York territory under the Buffalo branch.

AMERICAN EXPORTS OF TIRE REPAIR MATERIAL reached the record figure for April of $187,842. The leading purchasers were Australia, the United Kingdom, Denmark, Canada, Argentina, and British South Africa.

Massachusetts

With the approach of July, there has been a seasonal let down in rubber footwear production as evidenced by the usual shutdowns for vacations, inventories, and repairs. Tire plants are running full with good demand, and mechanical and sundry lines report increased activity over a month ago.

State Department of Labor figures for May show that the number of workers employed in three rubber footwear plants increased from 8,628 to 8,637, 1,494 of which were employed part time. Seven plants manufacturing rubber goods, including tires and tubes, showed 2,752 employed in May against 2,751 in April, only 7 of which were on part time. Wages in rubber footwear increased from $25.60 average to $26.85, and in rubber goods from $25.69 to $26.15, the male average being $27.85 and the female $15.16. Index numbers on employment showed the rubber footwear industry at 97.1 of normal, against 97. in April, and rubber goods, tires, and tubes at 123.4 against 122.5 in April.

The Hood Rubber Co. reports sales thus far in the new fiscal year, which began April 1, as very satisfactory. The plant will close on July 29 for one week in all departments to make necessary repairs and allow for vacations. Tire division of the company is now reported as running full.

The Boston Rubber Shoe Co., subsidiary of the United States Rubber Co., with plants in Malden and Melrose, has announced its annual closing from July 29 to August 15, in conformation with the closing of the other U. S. footwear plants.

Converse Rubber Shoe Co. will close its footwear plant from July 5 until July 25. The Converse Tire & Rubber Co. plant will, however, run full time during this period. Footwear sales of the shoe company are 20 per cent of a year ago, and the outlook is very good.

Firestone Footwear Co., Hudson, Massachusetts, has announced its closing for one week July 25-30 inclusive. The company has been running a big tennis ticket and will shift over to gaiters and winter goods after the shutdown.

Fisk Rubber Co. directors have voted to change the fiscal year from October 31 to the calendar year. Consequently no statement of the operations for the six months period ending April 30 will be issued. Instead the company will issue a statement for the eight months ending June 30 and at the same time will furnish results for the second quarter of the new fiscal year. These figures should be available the latter part of July. Fisk rubber has been enjoying good business thus far this year, with sales running well ahead of 1926. The daily output of the Cudahy and Chicopee plants has for some time totaled over 25,000 tires.

Norwalk Tire & Rubber Co. has omitted payment of the quarterly dividend of $1.75 on the 7 per cent cumulative preferred stock, due July 1, according to recent action of the board of directors.

Allen G. McKinnon, chief chemist of the Tyer Rubber Co., Andover, since 1922 has resigned to become chief chemist of the Taunton Rubber Co., Taunton, Massachusetts, manufacturers of rubber heels, soles, and molded specialties. The Taunton company has moved into the Greenfield tap and die buildings acquired recently and is said to be planning an extension of its line of rubber products.

Ralph S. Harlow, for many years associated with the old Mayflower Rubber Co., South Braintree, and for the past few years on the executive staff of the Alfred Hale Rubber Co., has resigned his position.

Sears, Roebuck & Co., the world's largest store, opened on June 25 a retail tire store at 790-792 Commonwealth avenue in the automobile district. F. C. Crane, local manager of the store, issued the following statement on the move:

"The growth of our automobile supply business has warranted the expansion in this field which is now taking place. It is our plan to sell over the counter, in regular retail fashion, the same merchandise as is to be found in our catalogs and at the same low prices which prevail there. Mail order customers in this territory may order tires, tubes, automobile accessories and camping equipment from the new Boston store.

Heel and sole demand has been more active in some districts. Quaboag Rubber Co., North Brookfield, is running a large production, and Killion Rubber Co., Dorchester, is reported to be turning out 20,000 pairs daily.

J. D. Wilmot has been appointed factory manager of the Woonsocket Rubber Co., Milville, Massachusetts, as well as the Milville Mill. Both companies represent subsidiaries of the United States Rubber Co., 1790 Broadway, New York, N. Y.

Cambridge Rubber Co.

The Cambridge Rubber Co., manufacturer of rubber footwear and clothing, had one of its most successful years in history, according to recent announcements. For the fiscal year ending March 31, sales were $3,878,867 which returned a net profit of $302,586 before preferred dividends of $10,846.50 and common dividends of $5,000. An initial common dividend of 25 cents was declared in February. The company earned 29 per cent of its net worth. Capitalization consists of $155,400 of $100 par 7 per cent cumulative preferred and 20,000 shares of no par common stock.

The company was incorporated in 1923 and is headed by Warren MacPherson, president and treasurer, in charge of finance and administration; George H. Rockwell, vice president and assistant treasurer, in charge of sales, and E. W. Dunbar, vice president and clerk, in charge of manufacturing. The plant employs 1,400 operatives. The annual two week shut down will be from July 2 to July 18 this year, after which the plant will resume full time on a large production of novelty gaiters on which the company was the pioneer with the "Raynboot."

Hood and Converse Pass Dividends

At a meeting of the board of directors of the Hood Rubber Co. on Thursday, June 16, it was voted to pass the common dividend on the company's stock, due July 1. This is the first time since the company's inception in 1898 that this dividend has been omitted. Directors of the Converse Rubber Shoe Co. at their meeting in May deferred payment of the quarterly dividend of the company's seven per cent cumulative preferred stock. This is the first time since the company's start in 1909 that this dividend has been omitted.

Those in close touch with the operations of the old established New England rubber companies realize that they are pursuing a wise policy at this time in conserving their cash resources. Both the Hood and Converse companies are in excellent condition as regards net quick assets over liabilities and report business well ahead of last year. As soon as conditions permit more profits from operations these dividends will undoubtedly be resumed.

Ashton-Deveer, Inc., factory distributer of automotive and radio equipment, is now in new quarters at 838 Commonwealth avenue, Boston, Massachusetts. The company has, in its present location, approximately 21,000 square feet of floor space, part of which is devoted to the tire department, which will eventually be made the organization's largest division. W. D. Maier is president.

George Vose, superintendent of the United Shoe Machinery Co. plant at Beverly, Massachusetts, together with Mrs. Vose celebrated his 50th wedding anniversary at his home in Beverly recently. Both Mr. and Mrs. Vose were the recipients of a purse of gold and a bouquet of flowers from the U. S. M. C. Relief Association. Officials of the company presented them with a number of remembrances in recognition of the anniversary.

The Archer Rubber Co., Milford, Massachusetts, is erecting a small addition to its present plant in order to give needed space for present production. The organization specializes in the manufacture of fine rubber fabrics, hospital sheeting, rubber tubing, etc.

The Donnelly Tire & Rubber Co., Inc., 145 High street, Hartford, Connecticut, is a distributer of Goodrich Silvertown tires.

Pennsylvania

The Nagle Machine Co., Twelfth street and East avenue, Erie, Pennsylvania, has taken over the plant and equipment of the Allen Machine Co., the purchase including the company's patents, drawings and patterns. The Nagle organization's output will be rubber working machinery, a specialty being made of tubers, strainers, mills and calenders. Executives of the new company include: T. M. Nagle, president; D. B. Nagle, treasurer; E. O'Connor, secretary. W. H. Shave will also be in charge of the engineering department and W. M. Jones will handle the company's sales.

D. A. Currie, vice president and general manager of the Erie Foundry Co., 1227-57 West 12th street, Erie, Pennsylvania, manufacturer of forge shop equipment, announces that the organization has established a rubber machinery division. J. A. Himrod, formerly vice president of the Allen Machine Co., will be manager of this new department, whose output will include tubers, strainers, calenders, mills and presses.

The Pugh Tire Co., 308 House Building, Pittsburgh, Pennsylvania, is operating a chain of tire stores in the larger cities of Ohio, Pennsylvania, and West Virginia. The only make of casings handled is the Goodrich Silvertown, these tires being sold on the "Pugh Payment Plan." John R. Pugh is president.

E. Gray Webber, formerly superintendent of the Lee Tire & Rubber Co., Conshohocken, Pennsylvania, is now associated in a similar capacity with the Hydro-United Tire Corporation, Pottstown, Pennsylvania.

Obituary

Chairman of Westinghouse Board

On June 14 Brigadier General Guy Eastman Tripp, chairman of the board of directors, Westinghouse Electric & Manufacturing Co., died in the New York Hospital, death resulting from various complications. With him at the time of his death were his wife, a son-in-law and one of his daughters, Mrs. Clifford Hemphill.

Sixty-two years ago General Tripp was born in Wells, Maine, a son of Alonzo K. and Abbie F. Tripp. Educated in the local schools of the district, General Tripp at the age of eighteen entered the employ of the Eastern Railway Co., at Salem, Massachusetts, beginning work as a clerk. In 1890 he became storekeeper and later traveling auditor of the Thompson-Houston Electric Co., while in 1897 he became associated with Stone & Webster, construction engineers and operators of public utilities, where he successively held positions of much importance and responsibility. He was then appointed vice president of the Stone & Webster Management Association and also of the Stone & Webster Engineering Corporation.

Guy E. Tripp

His connection with the Westinghouse company began February 10, 1912, when he was selected for the position of chairman of the organization's board of directors, a post which he held until the time of his death. Much of the company's advance has been due to the wise counsel and sound financial judgment of General Tripp, and under his guidance the Westinghouse organization assumed its place among the world's leading industrial concerns.

Treasurer of J. H. Lane & Co.

Executives of J. H. Lane & Co., specialist in fabrics for the rubber trade, announce the death on May 22 of their treasurer, James Warren Lane, who had been connected with their organization throughout his entire business career. Mr. Lane, who was sixty-two years old, died in St. James, Long Island, N. Y.

He was born in Orange, New Jersey, and was educated in various schools in New York and Europe, being graduated in 1884 from the College of the City of New York. Immediately after his graduation, he became a member of the firm of J. H. Lane & Co., and after its incorporation he was made treasurer, a position he continued to hold until the time of his death. He was also president of the E. W. Bliss Co., Brooklyn, New York, and the West Boylston Manufacturing Co., Easthampton, Massachusetts. His clubs and other affiliations included: The Union League Club of New York; the New York Yacht Club; the National Golf Links of America; the Metropolitan Club; the New York University Alumni; the Links Club; the Class of '84, City College of New York; and the St. Cloud Country Club, St. Cloud, France.

Texas

The National Rubber Filler Co., Midlothian, Texas, is specializing in the production of a rubber cushioning material for tires, which is intended to take the place of inner tubes or air chambers. This rubber filler, which is placed directly in the casing, is said to add thirty to fifty per cent to tire mileage, while it can be transferred to another casing when the original tire finally wears out. Executives of the organization include: W. W. Major, president; Q. C. Stanberry, vice president and manager; J. S. Monroe, secretary; and E. L. Bynum, treasurer.

Connecticut

The Norwalk Tire & Rubber Co., Inc., Norwalk, Connecticut, has formed an alliance with the Raritan Rubber Co., whereby the salesmen of the first mentioned organization will handle Raritan solid tires in addition to their regular lines of Norwalk casings. A better relationship among its dealers is also being planned by officials of the Norwalk company, a conference with this purpose in view being held June 2 at the Hotel Empire, New York City. About fifty dealers from the New York and New Jersey districts were in attendance at this special session.

New Jersey

The output of tires and tubes shows a gain in some of the New Jersey plants; however, one large Trenton concern had to close down temporarily, due to lack of orders. All mechanical goods plants report conditions as being good. The hard rubber situation does not show any signs of improving and the outlook is not very promising. Production of rubber cloth is very good. New Jersey manufacturers believe that the depression is due to conditions in the automotive industry. Some of the larger automobile manufacturers have cut down production which greatly affects the output of tires and tubes.

The Ajax Rubber Co. closed its Trenton plant for the entire month of June, but officials are hopeful that operations would be resumed during the mid-summer. The Ajax company has a large stock of tires and tubes on hand and is prepared to take care of the trade while the plant is closed. The company's laboratories and testing departments remain open and the company is ready to operate as soon as orders are received.

The Luzerne Rubber Co., Trenton, New Jersey, announces that business has not improved during the past month. The company manufactures hard rubber goods exclusively.

The Murray Rubber Co., Trenton, New Jersey, reports an increase in the production of tires and tubes during the past few weeks. The mechanical department of the Murray company is quite busy.

A. Lowenstein, 110 Lillie street, Newark, New Jersey, has let a contract for a building to be used as a scrap rubber factory. The building will be one-story, 100 by 125 feet, brick and steel.

The Pierce Roberts Rubber Co., Trenton, New Jersey, reports that enough orders are on hand to keep the factory busy all summer. The company specializes in molded rubber goods.

The Thermoid Rubber Co., Trenton, New Jersey, states that business has fallen off a little during the past month, due to a decline in the automotive industry.

Raritan Rubber, Inc., Jersey avenue, New Brunswick, New Jersey, announces the election of the following executives at the company's annual meeting: Alfred Foster, formerly treasurer, became president; William Dudde became treasurer, while Maxwell M. Kahn and Russell E. Watson remain respectively vice president and secretary.

The Thermoid Rubber Co. and the Stokes Asbestos Co., Trenton, New Jersey, have adopted a cooperative group insurance plan, effective through contract with the Metropolitan Insurance Co., which provides more than $600,000 of life insurance for the employes of the two organizations. According to the new arrangements, each employe in the main classification receives $1,000 insurance while among the other terms of the contract is one which provides an income for the employe himself in case total and permanent disability develops before the age of sixty. The group insurance program, as planned by the two Trenton companies, supplements a practicable pension system and a beneficial association which makes weekly payments to its members when unable to work because of illness.

The Pocono Rubber Cloth Co., Trenton, New Jersey., announces that business is very good in all departments. The new building recently leased for factory purposes is also running to capacity.

The Combination Rubber Co., Trenton, New Jersey, has made A. E. Williams its plant superintendent. Mr. Williams was formerly associated with the Murray Rubber Co.

Whitehead Brothers Rubber Co., Trenton, New Jersey, is very busy at the present time, and some departments are working overtime to catch up with the orders.

Paramount Rubber Co. of New Jersey, manufacturers of rubber balls and novelties, is operating two factories at Paterson and reports business as exceptionally good with a considerable quantity of orders on hand.

Frank W. Servis, former secretary, and A. R. Colvin, former factory manager, of the Combination Rubber Manufacturing Co., have severed their connections with that concern and have incorporated as Colvin & Servis, Inc., to manufacture and rebuild tires and to deal in tires, tubes and repair materials. The factory is located in Rahway, New Jersey.

F. Robert Lee, general sales manager of the Thermoid Rubber Co., Trenton, New Jersey, is on a western business trip and will visit all the Pacific Coast branches of the company. He will also attend the annual convention of the automotive jobbers to be held at Portland, Oregon.

C. O. Tingley, Rahway, New Jersey, has completed the installation of new machinery for manufacturing inner tubes and William McCullom, general manager, advises that the outlook for new business in this line is very encouraging.

Harvey Shomo, of the Fisk Flap Tube Rubber Co., Yardville, New Jersey, advises that the installation of new boilers and other equipment is entirely completed and in operation. The company manufactures a patented inner tube with flap attached which is said to obviate the necessity of a separate flap.

S. Hodge Smith, of the Kelly Springfield Tire Co., has invented and patented an expanding flap for tires which is said to be proof against shifting and pinching.

Dural Rubber Corp., Flemington, New Jersey, is running at top capacity on inner tubes and molded articles. Officers of the company are: Arthur F. Foran, chairman of the board; George K. Large, treasurer; William E. Ehrenfeld, president and general manager; F. R. Williamson, vice president; Russell Case, secretary and sales manager.

Puritan Rubber Co., Trenton, New Jersey, is installing new machinery and equipment for the manufacture of rubber cement. The plant is reported to be operating at capacity on floor covering materials.

L. B. Schleeder, formerly factory manager of the Yale Tire & Rubber Co., later becoming identified with interests in Florida, has reentered the rubber manufacturing as superintendent of Sterling Tire Corp., Rutherford, New Jersey.

C. Francis Fisk, president of the Fisk Flap Tube Rubber Co., Yardville, New Jersey, who has been ill for several weeks, is recovering rapidly and is expected to be back at his desk within the next ten days.

Ray H. Paddock, general sales manager of the Murray Rubber Co., Trenton, New Jersey, has resigned his position and is now in charge of sales for the Malcolm Tire Co., 2 West 61st street, New York, N. Y. Mr. Paddock was connected with the Murray company for twenty-six years. His home is in Morris Heights, Pennsylvania.

A. H. Massey, of Cleveland, Ohio, has been appointed general sales manager of the Combination Rubber Co., Trenton, New Jersey. Mr. Massey was western representative for the Combination company for several years and has been affiliated with the concern for the past nine years.

A. E. Williams, formerly factory superintendent of the Murray Rubber Co., is now superintendent of the Combination Rubber Manufacturing Co.'s plant, succeeding A. R. Colvin who has resigned to engage in business on his own account.

William W. McMahan, vice president and general manager of the Ajax Rubber Co., Trenton, New Jersey, has returned from a business trip to Detroit, where he visited the automobile plants. Conditions there, he said, were not very encouraging.

Pacific Coast

Only a few of the larger rubber manufacturing concerns and branches of eastern and mid-west factories report a satisfactory condition of business for the latter part of May and the first half of June. A general slowing of sales and slackening in collections have been very generally experienced throughout the Pacific Coast field. Reasons given for the easing off in business, especially in the tire trade, have been chiefly the backward summer and a widespread impression that a substantial drop in tire prices was impending and hence reluctance about buying until the new figures on casings are announced. When large mail order concerns having Pacific Coast branches recently cut prices about 10 per cent on Ford size tires, local dealers and manufacturers sought to meet the cut by adjusting prices on secondary 30 by 3½-inch casings to an equal extent. The downward revision is said to have proved a good stroke thus far, but the market is plainly nervous where it is not hesitant. However, a little favorable weather and some plain statements about improbable price cuts may quickly stir sales.

Crude rubber shipments to the Pacific Coast continue to increase, one of the latest of the large cargoes being nearly 1,000,000 pounds, consigned from Singapore to the Goodyear Tire & Rubber Co. in Los Angeles. It took eighteen freight cars to carry the rubber from the harbor to the factory twenty miles distant. In April the Goodyear rubber imports were close to 4,000,000 pounds.

The Goodyear Tire & Rubber Co.'s Los Angeles plant is now producing an average of 8,500 tires and 6,500 inner tubes a day, and is working on three 8-hour shifts. The same time schedule is also being maintained by the adjoining cotton mills, as the Goodyear Textile Works are called. The big addition to the tire factory is scheduled for completion July 10 and will be occupied for storage and production. A delegation of members of the Society of Automotive Engineers was recently entertained at the tire factory.

The United States Rubber Co. is one of the concerns which reports that it has nothing to complain of in the way of sales in contrast with a year ago. Substantial increases are reported at all the Pacific Coast branches and the prospects are regarded as excellent. J. B. Brady, of San Francisco, Pacific Coast manager, has been conferring recently in the southern California field with Branch Manager J. B. Magee of Los Angeles, and the latter has just returned from a survey of the territory covered by the San Diego and Phoenix sub-branches.

The Thermoid Rubber Co. reports sales of belting, packing and hose on the Pacific Coast as being well above the average. It is stated that its distributers in southern California, the Victor Belting Co., Los Angeles, disposed of more Thermoid brake lining for oil well rotary drilling machines for the past year than in 1923, when the southwest oil boom was at its height.

H. M. Bacon, Pacific Coast manager of The B. F. Goodrich Rubber Co., Akron, Ohio, and stationed at San Francisco, has gone to Akron for a conference.

J. W. Whitehead, sales manager of the Norwalk Tire & Rubber Co., Norwalk, Connecticut, was a recent visitor on the Pacific Coast.

The Huntington Rubber Mills, Portland, Oregon, reports good business in mechanical specialties, and the chances are that the volume will be well sustained for the remainder of the year. The factory is still running on two 8-hour shifts. The most noteworthy recent progress has been in the way of reduction of manufacturing costs and the improvement in processes.

Columbia Tire Corp., Portland, Oregon, according to Secretary K. C. Mohrhardt, has up to very recently been enjoying an excellent business. A little slowing up in sales has lately been experienced, traceable to a recession in all commercial lines in the Northwest, but advices are that the lull is likely to be only temporary.

The W. J. Voit Rubber Co., which has succeeded the V-T Rubber Co., 970 South Alameda street, Los Angeles, California, plans to manufacture air goods and sponge rubber cushions. The company is now installing suitable equipment in a factory on East Adams street. At the South Alameda address it manufactures camelback and general tire repair materials, and maintains a well-appointed rubber laboratory.

Norman Ryner, rubber planter, of Maturata, Ceylon, has been a recent visitor to the Pacific Coast.

The Coast Tire & Rubber Co., Oakland, California, announced a substantial reduction in the prices of its entire line of tires in the last week in May.

The Golden State Rubber Mills, 1920 East Vernon avenue, Los Angeles, California, according to President Emmet W. Long, finds a steadily increasing demand for rubber goods used in the oil fields, succeeding a prolonged slump in the oil industry due to excessive production. Sales of miscellaneous mechanicals are excellent, and a remarkable demand is said to have suddenly developed from all over the country for a unique tank ball of nearly pure rubber, just patented.

Rubber Products Company of America's stockholders have been holding conferences recently in the hope of clearing up some difficulties connected with the operation of a reclaiming plant at Bates City near Los Angeles. The concern had contracted to make a flooring material, operating under rubber reclaiming patents issued to Cyrus Field Willard of San Diego, to whom such rights have reverted, he states, through the failure of the concern to carry out contract stipulations.

The Tire Dealers' Division of the Southern California Automobile Trades Association had a "revival session" in mid-June. The division, which has some 70 members, had done much to correct faulty trade practices, but of late it had been inactive. The officers are: Chairman, L. F. Fitzgerald; vice chairman, B. Wynns; treasurer, W. F. Hackett; secretary, H. B. Pier; address, 2534 South Hill street, Los Angeles, California.

Hood Rubber Products Co., it is stated, has been experiencing good business lately in nearly all its lines. The company maintains but three branches on the Pacific Coast, one in Seattle with O. C. Hanson in charge, the main branch in San Francisco in care of Pacific Coast District Manager A. J. O'Connor, and a Los Angeles branch in charge of Ralph T. Eastman at 1931 Bay street. At the latter branch heels have just been added to the tire and battery jar lines. Mr. Eastman has just replaced W. B. Gardner, who has gone back to the sales department at the Hood factory in Watertown, Massachusetts.

The B. F. Goodrich Co., of Akron, Ohio, is planning, on the completion of its projected big factory in Los Angeles, to move its present branch office on East Seventh near Alameda street to a more central situation. While the

factory will have many advantages, it would not be convenient for city service. Tentative plans for financing the new company follow much the same lines as those of the British and Canadian Goodrich companies, and provide for $7,000,000 capital, of which $3,000,000 would be applied for land, buildings, and equipment and $4,000,000 for operating. The Los Angeles branch is now stated to rank third in sales of all Goodrich branches.

Thomas W. Cramer has been made district manager at Seattle, Washington, for the General Tire & Rubber Co., Akron, Ohio. Mr. Cramer has had

Thomas W. Cramer

a wide experience in the tire industry, while for the past five years he has been acting as special sales representative for the General company in the Dallas, Texas, and Kansas City, Missouri, districts.

The Mohawk Rubber Co., Akron, Ohio, has moved its Los Angeles, California, branch to new and larger quarters at the corner of Enterprise and Santa Fe avenues, the change in location providing 13,000 square feet of storage space.

The Mason Tire & Rubber Co., Kent, Ohio, has appointed L. B. Foster as manager of its branch at Seattle, Washington.

The Century Rubber Works, 54th avenue and 18th street, Chicago, Illinois, has appointed L. J. Wathier as Pacific Coast district manager, with headquarters at 1320-22 Santa Fe avenue, Los Angeles, California, and with branch offices at 630 Van Ness avenue, San Francisco.

H. E. Calif, 1055 Post street, San Francisco, California, has for twenty years been a representative of the Goodyear Tire & Rubber Co., having been the first distributer of that company's tires in San Francisco. Mr. Calif has twice been compelled to move his establishment to larger quarters, his present location providing excellent facilities for service.

Midwest

The Century Rubber Works, 54th avenue and 18th street, Chicago, Illinois, has established a branch at 232 Michigan street, S. W., Grand Rapids, Michigan. C. T. Stift, formerly associated with the Firestone and Michelin organizations, is manager of this division.

The M & M Manufacturing Co., Findlay, Ohio, specializing in the production of Belmore cord tires and inner tubes, has moved its sales offices from 208 North Wabash avenue to 451-469 East Ohio street, Chicago, Illinois. Executives of the organization state that this change to larger quarters was made necessary by the fact that sales in 1926 were more than 300 per cent greater than in 1925. Joseph A. Berger is sales manager.

The Lake Shore Tire & Rubber Co., 24th and Scott streets, Des Moines, Iowa, began operations May 23, 1927. The plant site covers 33⅓ acres, the buildings and equipment being appraised at approximately $295,000. The company expects to run its plant at full capacity in the near future, with an output of 1,000 tires daily. Executives of the organization include: A. W. Jefferis, president; S. W. Lowry, vice president, and H. S. McDonald, secretary-treasurer.

Taylor's Tire Shop, 227 South St. Joe street, South Bend, Indiana, has opened a branch store at 301 North Main street, Mishawaka, Indiana. In both establishments Firestone pneumatic and solid truck tires are handled exclusively.

The Wasser Supply Co., Hammond, Indiana, a branch of the Gary Plumbers' Supply Co., Gary, Indiana, is a wholesaler in such materials as Wolff enamelware, Pierce boilers and radiation, as well as a full line of plumbing and heating supplies. Robert E. Holmes is manager of the company's new mill supply department.

The A. J. Stephens Co., Fifteenth and Chestnut streets, Kansas City, Missouri, has recently increased its capital from $250,000 to $500,000. The organization reports an output of approximately 30,000 items daily, these products including chiefly inner tubes, fan belts, radiator hose, reliners, blowout patches, etc. Executives are: A. J. Stephens, president; T. D. Hinchcliffe, vice president and general manager, and F. H. Taylor, advertising and sales manager.

The Nebraska Tire & Rubber Co., Inc., 3167-77 Spaulding street, Omaha, Nebraska, has been in operation since 1919, the present output of the plant being about 600 tires daily. Plans have been made to increase this production almost immediately to 1,000 tires daily. The organization reports that 1926 represented an excellent period for business, both from a profit and production standpoint. Executives include: S. C. Wolfe, president and treasurer; J. E. Cornish, vice president; and F. M. Holloway, secretary and general manager.

The Chicago Rubber Clothing Co., Racine, Wisconsin, is enlarging its plant by the construction of two additions to its spreader proofing and calendered proofing departments. E. C. Woods is vice president.

The Falk Corporation, Milwaukee, Wisconsin, manufacturer of herringbone gears and other equipment used by the rubber industry, has opened branch offices at 122 South Michigan avenue, Chicago, Illinois, with C. H. Thomas in charge.

The Gillette Rubber Co., Eau Claire, Wisconsin, is at the present time manufacturing over 4,000 tires a day, the daily output also including approximately 9,000 inner tubes and 3,000 bicycle tires. R. W. Hutchens is vice president and factory manager.

NEW VALVE TOOL

Four tools in one describes in substance the new valve tool now being produced by The Dill Manufacturing Co., Cleveland, Ohio. It is a handy device for removing or inserting valve insides, rethreading the inside or outside of the valve stem and deflating the inner tube. It differs from others of its kind in that all of the individual tools are inside the case, which is about the diameter of a half dollar and about three times as thick. Because of its size and shape it is easily carried and thus meets the approval of car owners.

TIRE LABOR COST

In the 126 tire and tube works in the United States it is stated that 31,670 operatives got $120,614,081 in wages for producing in 1925 goods that sold for $822,136,213. At that rate labor cost averaged almost .147 per cent. Even this moderate ratio may be found lower for 1926, in which year there had been a decided improvement in the methods and machinery of American rubber mills.

Canada

Sales of tennis and golf footwear are of fair volume in Canada at present and with the coming of warm weather they should increase, as more tennis and golf is being played these days than ever before. It would not be surprising to see sales in sports footwear achieve a new sales record this season.

Manufacturers of rubber footwear are enthusiastic over the new low-cut overshoe and expect it will be a big factor in next season's business, not only because it is a novelty, but also because it answers a definite purpose not served by any other type of rubber footwear. This means added sales by reason of the fact that the low cut supplements, but does not replace, the customary type of overshoe, which will still be as necessary and popular as ever during the winter months. Apart from distinctive shape and protective features, the low-cut gaiter allows variety in both colors and materials used in its make-up. In all wearing apparel, style is the principal selling feature, so that the introduction of novelty into the rubber footwear business cannot help but greatly stimulate demand.

Dominion Rubber Co., Ltd. The season has arrived for the sale of athletic footwear and this firm is utilizing printer's ink heavily, featuring its well-known line of Fleet Foot tennis, sporting, and outing shoes.

Dunlop Tire & Rubber Goods Co., Ltd. An immense sign erected on this firm's Montreal building imparts the information that some one buys a Dunlop tire every two seconds of the day.

The Peerless Rubber Co., Ltd., recently formed, has taken over the plant of the Oak Tire & Rubber Co., Ltd., Oakville, Ontario. J. A. Martineau, formerly advertising manager of the Goodyear Tire & Rubber Co. of Canada, Ltd., is secretary-treasurer and also in charge of sales. The plant will be enlarged and in operation early in the fall, producing tires, tubes, rubber matting, heels and other rubber products. The plant will have an initial capacity of 500 tires and 750 tubes a day.

C. H. Carlisle, president of Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, was one of a number of speakers at the recent luncheon featuring the opening of the new Breay-Nash Motors, Ltd., showrooms and building, in Toronto.

A. E. Hilder, Toronto, is distributing in Canada a puncture proof tube, known as the Safety Grip, which is now being manufactured and marketed in the Dominion.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, is using full pages in leading newspapers throughout Canada announcing the new Goodyear balloon tire as "the World's Greatest Tire."

Golf ball imports. Taking the population of the Dominion of Canada at nearly 9,000,000, one golf ball was imported for every sixteen persons during the twelve months ended April, 1927. Total imports for the twelve month period were 45,467 dozen golf balls, valued at $185,743, compared with imports of 40,490 dozen, valued $166,975 during the previous twelve months.

Seiberling Rubber Co. of Canada, Ltd., which has taken over the K. & S. Tire Co., located in Toronto, is now running full capacity on Seiberling tires.

The Canadian Manufacturers' Association recently elected the following rubber men as executives: Joseph Maton, Miner Rubber Co., Ltd., Montreal, to serve on the Export Committee of the Quebec Division; L. V. Sicotte, Goodyear Cotton Co., Ltd., St. Hyacinthe, Quebec, honorary secretary of the St. Hyacinthe branch; E. W. BeSaw, Firestone Tire & Rubber Co., of Canada Ltd., Hamilton, Ontario, to serve on the Membership Committee of the Hamilton Division; C. N. Larsen, Gutta Percha & Rubber Co., Ltd., Winnipeg, Manitoba, a member of the Executive Committee of the Prairie Division; and R. E. Jamieson, Gregory Tire & Rubber 1926, Ltd., Port Coquitlam, B. C., vice chairman of the British Columbia Division of the Canadian Manufacturers' Association.

Horace Freeman, consulting chemist of the Canadian Institute of Chemistry, recently addressed the Rotary Club of Montreal on the need of patent protection, particularly those involving some chemical process. Mr. Freeman cited the case of a man from Seattle who conceived the idea of mixing fish oil with rubber for use in the manufacture of tires. He patented his process in Canada and then sold the patent to a company for $60,000 in cash and $100,000 in stock. The whole business was a failure, but the alleged inventor got back to Seattle with the $60,000 intact. "Who was to blame?" Mr. Freeman asked. "Was it the inventor, the business men, or the patent office? I am inclined to think that all three were to blame and that the Canadian Institute of Chemistry, as it progresses, will be able to do much to prevent such occurrences by making itself the qualifying body for all chemists who shall practise in the Dominion."

Canadian Exports

Although tire casings account for over half of the total export value of Canadian rubber products, some of the other products going to overseas markets are of importance, as will be seen from the following comparative table:

	1927	1926
Bicycle tires	$1,680	$.....
Solid tires	341,787	283,712
Pneumatic tire casings	15,550,571	11,616,505
Inner tubes	2,671,871	2,103,484
Rubber belting	547,031	657,121
Boots and shoes (rubber soles)	2,498,180	2,115,082
Canvas shoes (rubber soles)	3,876,441	2,747,861
Other products	676,187	488,555
Rubber hose	279,489	235,214
Rubber clothing	25,479	44,228
Insulated wire	387,573	380,346
Total	$26,786,289	$20,672,108

It should be noted, when comparing values of rubber products exported in 1927 and 1926, that there has been a considerable revision downward in the price of raw rubber, which has in turn been reflected in the cost of the finished material. The increase in values, therefore, is due to the larger volume of exports. Pneumatic tire casings, for example, increased in number from 1,010,070 in 1925-26 to 1,344,675 last year; inner tubes, 1,103,012 to 1,326,390; and canvas shoes, with rubber soles, from 3,722,448 to 5,125,288.

RUBBER FOOTWEAR EXPORTS

Exports of rubber footwear from the United States, Canada, and the United Kingdom represent each year, according to the Department of Commerce, more than 50 per cent of such goods as shipped in international trade. During 1926 the United States exported 8,477,955 pairs, Canada 6,630,063 pairs, and the United Kingdom 2,744,976 pairs, or a total of 17,852,994 pairs. The figures are, however, showing for the present year somewhat of a decline, the total exports from the three countries for the first quarter of 1926 being 3,829,523 pairs, while for the corresponding three months of 1927 the figure is 3,737,372. Germany, France, Sweden and Austria are proving to be important competitors, especially in the European footwear trade, while Japan supplies certain types of rubber footwear to Far Eastern markets.

JAPANESE RUBBER IMPORTS

Japanese imports of crude rubber during the first four months of 1927 have risen, according to the Department of Commerce, to 6,888 long tons as against the corresponding figure for the 1926 period of only 4,365 long tons. Imports however during the early months of 1926 were much lower than the monthly average for the year of 1,515 tons.

The Rubber Industry in Europe

Great Britain

Standard Rubber Production

The rubber industry throughout the world is interested in the official estimate for the current restriction year as made by the Federated Malay States Government regarding the standard production of rubber for the restriction area of Malaya. This estimate, at 333,840 tons, combined with the Ceylon figure of 73,839 tons, or a total of 407,679 tons for the fifth restriction year, compares with the total of 369,639 tons for the year previous. The latter figures include the Singapore and Penang totals, while the new figures evidently do not.

Use of Reclaimed Rubber

Those who are studying the future of the rubber industry are finding evidences of the steadily increasing consumption of crude rubber throughout the world, and they believe, especially if the restriction to 60 per cent of standard production is maintained for the next few months, that stocks will have to be drawn upon. It is prophesied that if this happens "there may be somewhat uncomfortable conditions during the first half of 1928," and also that the present low prices may be dearly paid for twelve months hence.

Just here the question of the use of reclaimed rubber comes up to complicate the problem. The *Rubber Age* (London) in a recent editorial entitled "The Unknown Factor" makes the following comment:

It is this doubtful factor of the use of reclaimed that makes any forecast as to the future of the rubber market doubtful. The bogey of the "unused coupon" should cause no palpitation to the most timid investor. It may be true that not even the Rubber Controller is able to say with precision what is the amount of these "credits" held in reserve, yet, at same time, there is good reason to conclude that the time limit imposed upon coupons has had the effect of speeding up the unloading of these disturbing reserves. At the worst it is a fair assumption that with any exceptional demand on the markets the present surplus of stocks would soon be reduced to the narrow margin of two years ago.

It is the reverse with reclaimed. The greater the demand for crude rubber and the higher the price, the stronger is the temptation to resort to the use of reclaimed. American statistics show a regular barometrical response of reclaimed to market conditions during the past eight years. When the price of crude rubber falls below a certain level the consumption of reclaimed diminishes in sympathy, and vice versa. The process has been shown to be fairly automatic and planters have to realize that they can only avoid this competitive element when prices for crude rubber are so low as to give reclaimed no advantage.

Tire Parts Taxed

The new tire import duty of 33 1/3 per cent ad valorem has been explained as being chargeable not only for automobile casings, but also for all motor bicycle and tricycle tires, including pneumatic outer covers, inner tubes, and solid tires; accessories and component parts, including patches, patching material and repair kits, tools and instruments for applying patches, tire boots, tire pumps, pressing gages, valves, valve caps, and other items of a similar nature. Any such goods produced in Canada or any other British country have a preferential two-thirds rate applied. When tires are imported as attached to complete vehicles, chassis, wheels or rims, their value, if included in the total value, need not be shown separately on the entry.

Britannia Rubber Co.'s New Plant

The Britannia Rubber & Kamptulicon Co. established in 1854 and one of the first rubber works to be organized in Great Britain after the discovery of vulcanization, has moved from Bow Common, near London, to its new factory at Alperton, Middlesex, where there are adequate facilities for present operations as well as for future expansion. The company's many years of experience enable it to supply hard and soft rubber goods for practically all purposes, a specialty being made however of the production of rubber sheeting, cushions and airproof goods, as well as proofed cloths for general upholstery and motor car furnishings.

Institution of the Rubber Industry

The Council of the Institution of the Rubber Industry elected a new board of examiners at a meeting on May 13 of members of the organization. The board is composed of sixteen well-known rubber men and is headed by the following: Lord Colwyn, president of the Institution; Sir Stanley Bois, past president; and Colonel J. Sealy Clarke, chairman of the Council.

The following Fellows and Associates were elected at the recent Council meeting: Fellowship, J. Entwisle, managing director of Hertfordshire Rubber Co., Ltd.; V. B. Wilson, managing director of Dunlop Rubber Co., Ltd. Associateship (Science), W. N. Lister, chief chemist of J. Mandleberg & Co., Ltd.; G. F. Thompson, assistant chemist, Charles Macintosh & Co., Ltd. Associateship (Engineering), W. Owen-Griffiths, London consultant to Francis Shaw & Co., Ltd.; C. W. Bailey, chief engineer, South African Rubber Manufacturing Co., Ltd. Associateship (General Rubber Technology) P. McMurray, works manager, Monarch Rubber Co.; and E. E. Eakins, section manager, Rotax (Motor Accessories), Ltd.

British Notes

North British Rubber Co. directors report a profit for last year of £112,857, against £111,446 for the year previous. This was accomplished in spite of heavy price reductions for tires during 1926, the result of a "price war" among international tire concerns. It is believed that the recent imposition of the duty of 33⅓ per cent upon foreign tires will do much to improve conditions in this branch of the industry.

The Dunlop Rubber Co. announces that Sir Hardman Lever and Sir Alexander Gibb have been elected directors of the organization, and that C. A. Proctor will continue as the managing director of the French Dunlop company and a director of the German Dunlop company. Because of the expanding business of the Dunlop organization on the Continent, Mr. Proctor has, however, been compelled to resign from the board of the company's English division, a post which he had held since 1919.

The India Rubber Manufacturers' Association has issued a standard price list for friction surface transmission belting. This list, which supersedes earlier ones, has been compiled by the technical experts of the leading British rubber belting manufacturers, and is prepared on the basis of production costs.

Some of the plantation companies have been paying astonishingly large dividends recently, among them being the following: Simo Rubber Co., 100 per cent for the year 1926, the dividend for 1925 having been 150 per cent; the Jugra Estate, 45 per cent for 1926, 60 per cent for 1925; United Sua Betong Co., 45 per cent for 1926, 55 per cent for 1925; Kuala Selangor Co., 41⅔ per cent for 1926, 62½ per cent for 1925; the Sapong Rubber & Tobacco Co., 40 per cent for 1926, and 50 per cent for 1925.

Germany

Exports of rubber goods from Germany during the quarter ended March, 1927, amounted to 39,126 quintals, value 23,448,000 marks against 46,007 quintals, value 28,195,000 marks in the corresponding period of 1926. Imports of manufactured goods during the first three months of 1927 were 8,927 quintals, value 5,643,000 marks against 5,553 quintals, value 2,837,000 marks in 1926.

This shows a distinct decrease both in quantity and value of German exports on the one hand, and an increase in imports amounting to roughly 60 per cent as regards quantity and about 100 per cent as to value, on the other.

Imports of crude rubber during the first quarter of 1927, it is interesting to note, were almost three times as high as in 1926, the respective figures having been 96,668 and 38,014. In addition imports of waste and old rubber in 1927 were 12,448 quintals against 7,121 quintal in 1926, while exports of this material came to 5,062 quintals in 1927 instead of 17,092 quintals in 1926.

Probably the high rubber prices ruling at the beginning of last year are to be held responsible for these differences.

The Motor Vehicle Exhibition

Tires, as is natural, formed an important part of the exhibits at the Motor Vehicle Exposition held at Cologne. The leading German tire producers, The Continental Caoutchouc & Gutta-Percha Compagnie, Hannover, The Harburger Gummiwarenfabrik Phoenix A.-G., Hannoversche Gummiwerke Excelsior A.-G., all had interesting exhibits.

It was noted at the exhibition that the big tire manufacturers have largely taken up low-pressure tires for trucks and buses. One of the sights was a double deck bus, with three axles fitted with six big Continental low-pressure tires, size 40 by 10.59 inches, which were inflated to only three atmospheres. This was the first bus of the kind to be equipped with pneumatic tires at all and that the tires should be of the balloon type called forth a lot of surprised comment.

By way of contrast, the Continental showed its smallest pneumatic truck tire, straight side, 22 by 4½, for a 13-inch rim. Drop center rims are gaining in popularity and are recommended for all passenger-cars, particularly a new small rim that has a diameter of only 18 inches against 19 and 20 inches.

The Phoenix company, which specializes in giant pneumatics for motor-trucks, showed a tire of this type which had already run 82,825 kilometers (kilometer = ⅝ miles) and which looked as though it might continue to be serviceable up to 100,000 kilometers. Phoenix also showed a novelty, a rubber "mushroom" recommended to close damages caused to tires by nails. The "mushrooms" are coated with a solution on the under side and put into the opening in the tire with the aid of a pair of tweezers.

Exelsior displayed a full line of pneumatic tires in an artistically decorated stand, where the new trade mark, a comical white Excelsior dog, called forth many a laugh. Incidentally, big German firms seem to be going in far this kind of advertising, the funny Herr Conti Schwarz, used to advertise Continental tires, and Harburger's Prof. Kautschuk already being quite well known.

Manufacturers Raise Prices

Increases of 5 to 10 per cent in the price of technical rubber goods, effective April 25, 1927, have been announced by German manufacturers. The producers of surgical hard and soft rubber goods followed suit and decided on a uniform increase of 10 per cent on all their products as from May 1.

Next the Union of Tire Manufacturers informed the trade that from May 2 prices on automobile pneumatics and giant pneumatics would be 10 per cent higher. The last to publish increases, also of 10 per cent, in prevailing prices so far were producers of sponge rubber and various articles made of this material.

Further increases are shortly expected as manufacturers have in many cases worked at a loss, and it is claimed the present raise of 10 per cent barely covers the increased cost of production.

Russia

Owing to favorable conditions, the production of rubber footwear by the Russian Rubber Trust increased markedly during 1925-26 against 1924-25, the figures being 25,300,600 pairs against 15,730,800 pairs, or an increase of over 60 per cent. On the other hand the output of pneumatic articles fell to 503,400 from 894,500, or almost 40 per cent. The value of the total output in 1925-26 was 95,630,100 pre-war rubles and in 1924-25, 73,894,500 rubles.

Latest reports show developments continue to follow the same trend. Thus in February, 1927, production of footwear increased 2 per cent, and of technical goods 2.1 per cent, while production of pneumatic goods dropped 11.2 per cent.

Austria

Imports of crude rubber, gutta percha and balata, including waste, into Austria during 1926 amounted to 22,716 quintals, value 15,300,000 schilling. Imports of manufactured goods included automobile covers, 3,561 quintals, value 4,088,000 schilling; covers for other tires, 1,248 quintals, value 900,000 schilling; tubes, 809 quintals, value 888,000 schilling; solid tires, 1,733 quintals, value 653,000 quintals. After tires the most important imports were: footwear, 1,150 quintals, value 1,487,000 schilling; elastic fabrics and rubberized fabrics, 1,447 quintals, value 2,170,000 schilling; rubber thread (not covered), 831 quintals, value 1,396,000 schilling.

Austria's exports of manufactured rubber are of more importance than her imports, mechanical goods topping the list as far as quantity is concerned. The figures for the various articles were: packing, 7,104 quintals, value 3,852,000 schilling; hose, 2,355 quintals, value 1,610,000 schilling; footwear, 4,643 quintals, value 5,552,000 schilling; soles and heels, 3,432 quintals, value 2,335,000 schilling; rubberized and elastic fabrics, 3,259 quintals, value 4,538,000 schilling; apparel, etc., 2,044 quintals, value 4,394,000 schilling. Other soft rubber goods accounted for 2,364 quintals, value 3,261,000 schilling. Hard rubber and manufactures thereof also form important items of exports, the figures for hard rubber in sheets, rods and tubes having been 698 quintals, value 588,000 schilling, and for hard-rubber goods, 1,132 quintals, value 2,307,000 schilling.

Polish Rubber Shoe Factory

The Pepege Oesterreichische Gummischuh Verkaufsgesellschaft m.b.H., has been established at Vienna to import, export and deal in the products of the First Polish Rubber Shoe Factory, Pepege, Polnische Gummi-Industrie A.-G. of Grudziadz, Poland. The territory this firm will cover will be limited to Austria, Czecho-Slovakia and Jugoslavia.

A RUBBER BED IN 1876

The *Gummi-Zeitung* shows an interesting illustration of an air mattress made by F. E. Bäumcher, Dresden, in 1876. The mattress and pillow were made of rubberized fabric and had valves through which air was introduced. In special cases, cold water instead of air could be used. The mattress was divided into three parts, each having its own valve so that all kinds of modifications in inflation could be carried out. When deflated, the mattress and pillow could easily be rolled up and strapped when it took up about the same space as a rolled traveling rug.

The Rubber Industry in the Far East

Malaya

If, as is brutally declared by some people, restriction has done nothing for the rubber industry, it at least has stimulated a great interest in rubber statistics. And as is natural when more people take to scanning the available figures with increasing attention, uncomfortable questions are asked and tables calculated to give the unsuspecting more or less violent jolts are produced.

For instance an enterprising statistician might make up a table comparing exports and imports in the four months of 1927 and 1926 and prefix these figures by the percentage exportable during the respective months, as follows:

	1926			1927		
	Per Cent Exportable	Gross Exports	Foreign Imports	Per Cent Exportable	Gross Exports	Foreign Imports
January ..	85	30,452	10,237	80	34,946	14,995
February ..	100	30,440	8,306	70	27,528	11,697
March	100	35,012	14,800	70	41,346	17,462
April	100	23,727	10,565	70	29,041	13,069
Totals		119,631	43,908		132,861	57,223

Then we should find that while the exportable percentage was higher in 1926, the exports in 1927 were a good bit above those of 1926, to be exact 13,230 tons for the four months. Of course this might be wholly ascribed to the phenomenal increases in native imports which were 13,315 tons more in the first four months of 1927 than in 1926. But we must not forget that something like 30 per cent is to be subtracted from the imports to allow for dirt and moisture in the wet rubber imported.

However, that would not materially alter the outstanding facts revealed by the table. First, that whereas a constantly falling market has necessitated a cut to 70 per cent (recently further reduced to 60 per cent) in exportable in order to keep surplus supplies off an apparently glutted market, Malayan exports actually exceeded shipments made when 100 per cent exportable was allowed. And second, that so-called native shipments continue to increase alarmingly although most authorities said they would drop, and now more than nullify any real reduction brought about by a tightening of restriction.

Standard Production

It is illuminating to reflect that in 1926 standard production was about 300,000 tons for Malaya, while for 1927 it has been placed at something over 330,000 tons, especially when it is remembered that in 1926 the high standard surprised and shocked most people, coming as it did after a succession of standards decried as being in excess of anything Malaya could produce. If standard was too high to begin with, why was it constantly increased? And supposing standard is really 10 to 15 per cent higher than it should be, and suppose further that about 10 per cent of native imports is smuggled rubber, and add to this the excess rubber that goes out under the so-called unused coupons it does seem as though restriction was being badly cramped. In view of all this, one can hardly blame the amateur investigator if he does somehow fail to understand how restriction could have kept 400,000 tons off the market, as it was reported recently.

Menace of Young Areas

There is another point that adds to the intricacy of restriction. Mr. Still, in his weekly letter to the *Straits Times*, states that he has figured out that the planted areas in Malaya which were not in bearing when restriction became law (which, therefore, were planted bebore restriction) are now capable of an output of about 70,000 tons and they will be making claims to increased age yields for two or three years yet. That is, on this head alone, standard will have to be raised during the next two or three years. Of course, according to Mr. Still's previous calculations, the great rubber shortage was going to take place precisely during those coming two or three years, when one would have thought an extra quantity of rubber would prove rather welcome than otherwise. But now Mr. Still thinks restriction will have to be resorted to for a few years more and he is worrying about increased yields from younger areas. One might almost think he is a little dubious about the effectiveness of restriction himself, to judge from the fact that he seems to believe that even after five years' operation, restriction will have brought so little improvement that, paradoxically, it will be needed for another two or three years at least, if not indefinitely.

New Plantings

There is much feeling in some quarters against a policy of expansion at this time of over-production and protests from shareholders on this head are frequent. It does seem rather a reckless proceeding with yields from young areas increasing and outputs from extensions made three or four years ago in very close prospect. However, it takes five years for a plantation to reach maturity and a lot of things can happen in five years. Many companies seem to be holding this viewpoint as can be seen from recently published company reports.

One chairman criticized the government's stand on the alienation of land for rubber and suggested that it would drive capital away from Malaya to the Dutch Colonies. He urged all Malayan companies which had jungle reserves and financial resources to maintain the British position as chief producers by pushing on extensions and to ignore what is going on in Liberia.

Interest in Bud Grafting

Information obtained from recent company reports not only indicate considerable activity in the extending of plantations, but that Malayan producers are making a big effort to make up for lost time and are eagerly experimenting with newest methods of Hevea propagation. Some estates already have selected clones from which to draw supplies of superior planting material while others will have such material available soon. It is evident that Malayan producers have been more than impressed by reports of increasing areas of superior trees in the Dutch colonies, which will soon be bearing.

Malayan Notes

Jeram Kuantan Rubber Estate, Ltd., added 127 acres to its planted area last year and 177 acres are ready for planting when a favorable season sets in. When supplies of clones from Prang Besar Estate are available, it is planned to bud graft a part of the available reserve.

New Serendah Rubber Co., Ltd., has applied for an area of 400 acres of jungle at the back of the estate, and this has been approved. The company intends to plant this area with approved material so as to be prepared for competition in years to come. The firm has a bud-grafted area which is giving gratifying results. The best clones will be selected and the new plantings will have the benefit of this. Over the year just closed, dividends amounting to 40 per cent were turned out.

Ceylon

Bud grafting is gaining ground in Ceylon. According to the annual report of the Rubber Research Scheme, interest in the propagation and selection of high-yielding strains of trees has now become fairly general and as for bud grafting, most estates with any reserve land are making arrangements to have new clearings budded. Several demonstrations have been given by the department in charge of this work and numerous estates have been visited and advice and instruction imparted.

Experiment Station

At the beginning of 1926, a 50-acre plot of jungle land was granted to the research scheme to form the nucleus of an experiment station. About 13 acres of this land were opened up and planted with seedlings, the progeny of known trees. These seedlings are to be used as stock for testing mother trees. Yield records of high-yielding trees on a large number of estates in different districts of the island have been received and bark samples from these trees have been examined. This work is continuing and correlation tables are being prepared to determine the important factors governing yield. The best material available is to be used for the supply of budwood to the Research Scheme Experiment Station.

Lack of Funds

Now that bud grafting has finally aroused in Ceylon the interest it deserves and local producers are eager to make up for lost time, lack of funds for work to be carried out on an adequate scale by local experiment stations threatens greatly to impede progress.

In November last the government's attention was called to the need of further grants to carry on the work properly, but up to the time of writing no reply had yet been received from the government. It has been urged that government be approached again and the suggestion has been offered that a kind of cess, similar to that on tea, be levied on rubber, the proceeds to go towards assisting experimental work.

Netherlands East Indies

The Commercial Association of Medan publishes its annual figures concerning exports, production and areas of rubber in the East Coast of Sumatra. According to the export figures, the quantity of European rubber leaving East Coast of Sumatra ports in 1926 was 54,946,777 kilos against 48,196,270 kilos in 1925. Shipments of latex were only 125,363 kilos instead of 6,367,587 kilos in 1925.

Native rubber shipments were 14,373,001 kilos against 15,711,863 kilos in 1925, a drop of almost 10 per cent. However, the decrease was greater for this district than for any other in the Dutch colonies, so that in the end of 1926 exports of native rubber did not fall far short of those for the year before.

Exports of wild gutta percha showed a considerable gain, the figures being 138,473 kilos and 36,765 kilos for 1925 and 1926 respectively.

The total shipments of estate rubber were actually higher than stated above, but a part of the rubber went over Langsa, in Atjeh, and was therefore not included in the East Coast Sumatra figures.

Different Nationalities

The Commercial Association, Medan, has this year again collected data showing the part that each of the participating nationalities has in the acreage and productions of rubber. This information has been tabulated and appears below.

Compared with 1925, when the acreage was over 188,000 hectares, the planted area has therefore increased by over 10,000 hectares. A similar increase was noted the year before, so that the boom prices of 1925 do not appear to have caused unduly great expansions in planting. The productive area also increased by about 10,000 hectares.

Nationality	Area of plantation Hectares	Area in bearings Hectares	Production Kilos	Yield per productive Hectares Kilos
British	65,769	54,089	19,540,133	361
Dutch	66,075	48,469	18,419,554	380
American	29,867	25,646	11,706,446	456
Franco-Belgian	25,962	18,000	7,124,867	396
German	2,460	2,008	1,019,885	507
Japanese	4,082	2,046	584,560	285
Swiss	2,277	1,306	621,307	476
Others	2,962	2,249	776,517	345
Totals	199,454	153,813	59,793,269	389

Higher Yields

It is worthy of note that the increase in output from about 51,000 tons in 1925 to almost 60,000 tons (metrical tons, equivalent to 2,204 pounds) is almost entirely due to increased yields. In 1925 the average yield per hectare (2.45 acres) was 353 kilos (kilo=2.2 pounds) and in 1926, 389 kilos.

It will be noted in the foregoing table that while the Dutch have the largest area planted, the British have the largest area in bearing, and their output is highest too. The British yield per hectare is lower than that of the Dutch, but it increased from 316 kilos in 1925 to 361 kilos in 1926. The American planted area was still less than half either that of British or Dutch, but most of it was in bearing, and the total production was almost 60 per cent that of the British and 63 per cent that of the Dutch, the American yield per hectare being considerably higher than that obtained by British or Dutch.

Forward Sales

Rubber Cultuur Maatschappij Amsterdam, reports a product of 11,329,426 pounds on the Sumatra estates and 1,356,292 pounds of rubber of the Java estates during 1926. The average price obtained was 1 shilling 11.4 pence per pound against 1 shilling 11.2 pence the previous year. The f. o. b. cost, including depreciations on buildings, factories, cost of recruiting inventory, etc., came to 0 shillings 6.7 pence (0 shilling 6.4 pence the year before).

The firm sold forward out of 1927 crop: (1) 4,520,000 pounds, at average 1 shilling 9 pence per pound f. o. b. Dutch East Indies port, January-April delivery General Rubber Co.; (2) 3,970,000 pounds at prevailing London prices for standard sheet, with a minimum of 1 shilling 2 pence per pound, May-December delivery, to General Rubber Co.; (3) 805,000 pounds, delivery May-December c. i. f. European port, at prevailing London prices for standard sheets, with minimum of 1 shilling and maximum 1 shilling 3 pence per pound, but beyond 1 shilling 5 pence one half the difference between the higher price and 1 shilling 5 pence will be paid the company.

Forward sales from 1928 crop were: 835,000 pounds, average 1 shilling 11.9 pence per pound f. o. b. Dutch East Indies port; 5,510,000 pounds to General Rubber Co. on terms as above under (2); 1,210,000 pounds, on terms as under (3).

Forward sales from 1929 crop: 5,510,000 pounds to General Rubber Co. on terms under (2).

Rubber Patents, Trade Marks and Designs

United States

May 10, 1927*

1,627,651 Heel. Kurt Kautzsch, Philadelphia, Pennsylvania.

1,627,670 Attachment device. Florain J. Shook, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,627,835 Pneumatic bed. Robert Lee Combs, Herington, Kansas.

1,627,933 Winding bobbin. Harry V. N. Snyder, Clifton, New Jersey, assignor to The Manhattan Rubber Manufacturing Co., a corporation of New Jersey.

1,628,064 Tire valve. Clarence S. Preston, San Diego, California.

1,628,440 Tire valve dust cap. Vernon L. Smithers, Akron, Ohio.

1,628,441 Tire air valve. Angelo L. Soresi, New York, N. Y.

1,628,582 Tire liner. Max A. Doelckner and Anthony P. Fanelli, Louisville, Kentucky.

May 17, 1927*

1,628,642 Inner tube. William J. Bowman, Smith Center, Kansas.

1,628,717 Play ball. John B. Flowers, Brooklyn, New Jersey.

1,628,790 Automobile tire. Paul P. Kostock, Chicago, Illinois.

1,628,835 Wool washer press roll. Frank L. Furbush, Westford, assignor to C. G. Sargent's Sons Corporation, Graniteville, both in Massachusetts.

1,629,108 Apparatus for treating varicose veins. Simon Lake, Milford, Connecticut.

1,629,178 Connection for torque arms. Florain J. Shook, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

1,629,289 Tire patch. Elsie A. Mueller, Chestertown, New York, and Charles C. Mueller, Newark, New Jersey.

1,629,335 Balloon tire patch. John F. Brady and Richard B. Ott, Ritzville, Washington.

1,629,364 Play ball. Frank C. Scholly, Philadelphia, Pennsylvania.

May 24, 1927*

1,629,715 Resilient wheel. Fritz Lenhardt, Mannheim-on-the-Rhine, Germany.

1,629,723 Water bag. Jesse R. Moler, Oakland, California.

1,629,811 Hose supporter. James A. Skaer, Wichita, Kansas.

1,629,838 Toy balloon valve. Melvin Perdue, Shelby, Ohio.

1,629,901 Tire valve. Frank M. Ahearn, Kinde, Michigan.

1,629,916 Cushioned heel. Maurice W. Hirshfield, New York, N. Y.

1,629,972 Auxiliary valve for pneumatic tire valve stems. William R. Royer, Wilkes-Barre, Pennsylvania.

1,630,040 Valve for inflatable articles. Frank A. Vogt, Elmer Fleisch and Hugo Goldsmith, assignors to The P. Goldsmith Sons Co., all of Cincinnati, Ohio.

1,630,086 Wringer roll. George R. Keltie, Woonsocket, Rhode Island, assignor to American Wringer Co., Inc., a corporation of Rhode Island.

1,630,135 Insole. Charles A. Roberts, Butte, Montana.

1,630,228 Dress shield. Bertha E. Tedstone, San Antonio, Texas.

May 31, 1927*

1,630,350 Resilient tire. Clyde S. Morse, De Kalb, Illinois.

1,630,445 Sole. Albert L. Murray, Auburn, Indiana.

1,630,535 Pneumatic tire. Hans Maul, Pasing, near Munich, Germany.

1,630,625 Scalp treatment hot water cap. Ralph Mauriell, Oceanport, New Jersey.

1,630,776 Resilient tire. Henry Bonawitz, Brooklyn, New York.

1,631,047 Boat. Hermann Meyer, Berlin, Germany.

1,631,050 Valve cap. Edward James Murphy, Framingham, Massachusetts.

* Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

REISSUE

16,641 Supporting band for pajama. George M. Harsh, Baltimore, Maryland. Filed January 8, 1927. Serial No. 159,969. Original No. 1,593,631, dated July 27, 1926. Serial No. 89,405, filed February 19, 1926.

Dominion of Canada

May 10, 1927

270,480 Pneumatic tire. John Robert O'Brien, Petersham, near Sydney, New South Wales, Australia.

270,488 Stocking or sock with rubber edge. Paul Dinus Schönfeld, Chemnitz, Saxony, Germany.

270,494 Horse collar. August H. Stahl, Grafton, Nebraska, U. S. A.

270,519 Bowling pin. The Brunswick-Balke-Collender Co. of Canada, Ltd., Toronto, Canada, assignee of The Brunswick-Balke-Collender Co. Wilmington, Delaware, and Chicago, Illinois, assignee of Joseph W. Bishop, Muskegon, Michigan, all in U. S. A.

270,526 Bowling pin. The Brunswick-Balke-Collender Co. of Canada, Ltd., Toronto, Ontario, assignee of The Brunswick-Balke-Collender Co., Wilmington, Delaware, and Chicago, Illinois, assignee of Harold J. Bluhm, Muskegon, Michigan, all in U. S. A.

270,527 Bowling pin. The Brunswick-Balke-Collender Co. of Canada, Ltd., Toronto Ontario, assignee of The Brunswick-Balke-Collender Co., Wilmington, Delaware, and Chicago, Illinois, assignee of Harold J. Bluhm, Muskegon, Michigan, all in U. S. A.

May 17, 1927

270,597 Steering wheel handle cover. Alfred George Barrett and Hubert Henry Burton, both of Leicester, England.

270,619 Tennis racket protector. Frederick George Collis, Southwark, England.

270,662 Shoe heel structure. Charles Miller, Long Island City, New York, U. S. A.

May 24, 1927

270,800 Dispensing bottle closure. Victor Reiman and Karl Becker, both of Dresden, Germany.

270,838 Inner tube protector. Jerome J. Leblanc, Montreal, Quebec.

270,945 Overshoe. The Cambridge Rubber Co., Cambridge, assignee of Warren Macpherson, Cambridge, and Ernest W. Dunbar, Hudson, all in Massachusetts, U. S. A.

May 31, 1927

271,117 Surgical appliance. Peter William Nelson, Chicago, Illinois, U. S. A.

271,156 Horse collar. James Horatio Wilson, Ottawa, Ontario.

271,216 Tire repair material. The Goodyear Tire & Rubber Co., assignee of William W. Stephen and Joseph P. Maider, all of Akron, Ohio, U. S. A.

United Kingdom

May 4, 1927

267,299 Block tire. S. I. W. Michell, Park Farm, Wootten Wawen, near Birmingham.

267,362 Book tabs. W. Hardy, 195, Hibson Road, Nelson, Lancashire.

267,399 Composition flooring. J. B. Losey, and W. R. Stone, both of Syracuse, New York, U. S. A.

267,439 Sponge. L. Halleux-Cerfontaine, 7 Rue du Casino, Brussels.

267,467† Universal joints. Kirchbach'sche Werke Kirchbach & Co., Coswig, Saxony, Germany.

267,473† Air ballonet for aerostat. L. Avorio, 25 Casella postale, Rome.

May 11, 1927

267,628 Shock absorber. H. C. Lord, Erie, Pennsylvania, U. S. A.

267,645 Tire attachments to rims. J. H. Preston, Roseneath, Padgate, Warrington, Lancashire.

267,672 Medical appliances. J. H., Frevoo, 6 Passauerstrasse, Berlin.

267,688 Road surface markings. E. W. Hunt, Vernon Lea, Brooklands Road, Higher Crumpsall, Prestwich, Lancashire.

267,700 Tire. T. C. Mussen, Toronto, Canada.

267,783 Tire. A. H. Shoemaker, Seattle, Washington, U. S. A.

267,860 Mine props. H. Meutsch, 85 Heinickestrasse, Essen-on-Ruhr, Germany.

267,863 Hair waving appliance. B. M. Ray, 326 Oxford street, London.

267,962† Fastening device. P. Hahn, 90 Müllerstrasse, Berlin.

May 18, 1927

267,988 Socket for artificial limb. C. D. W. and W. A. D. Blatchford, 90, Clapham Road, and P. E. B. Fooks, 60, Carey street, both in London.

268,059 Braces. P. Renucci, 223, Saracen street, Possilpark, Glasgow.

268,100 Window holders. C. A. Smith, Tryst, Kellaway avenue, and S. E. Smith, Clare Street House, both in Bristol.

268,118 Thermionic valve holder. C. J. Payne, 111, Church Lane, Charlton, London.

268,133 Endless conveyer. C. H. Gray, 106, Cannon street, London.

268,165 Mask. W. Topping, 15, Sterndale Road, London.

268,166 Elastic fabric. P. J. Laurent, 19 Rue Désiré-Claude, St. Etienne, Loire, France.

268,177 Universal joints. H. Frood, and Ferodo, Ltd., Sovereign Mills, Chapel-en-le-Frith, Derbyshire.

268,178 Solid tire. M. McTigue, New York, N. Y., U. S. A.

May 25, 1927

268,418 Electric cables. Macintosh Cable Co., Ltd., 2, Cambridge street, Manchester, and A. W. Williams, 290, Mansfield Road, Nottingham.

268,438 Roads. N. L. Derham, 31A, Spray street, Woolwich, London.

268,451 Tire inflating valve. J. F. and W. T. Barnes, 180, Camberwell Road, Upper Hawthorn, Victoria, Australia.

268,465 Gramophone connection. C. M. Stoney, 149, South Lambeth Road, London.

268,584 Inflatable toy balloon. R. S. and A. W. Dowell, Globe Works, Chatsworth Road, Clapton Park, London.

268,698 Boot uppers. E. Klapp, 2, Panoramastrasse, Oberlossnitz, near Dresden, Germany.

268,706 Athletic shoe fastening. F. and W. Kogelboom, 33, Rheinstrasse, Krefeld, Germany.

†Not yet accepted.

Germany

444,367 Occlusive pessary. Dr. August Fiessler, Kaiserallee 31 a., Berlin-Wilmerstorf.

444,624 Sponge rubber seat. Alfred Becher, Hohenstauffenstrasse 22, Berlin.

444,683 Protective rubber device when washing the hair. Lina Weber, Ettlingen, Baden.

445,005 Footwear. Philipp Sommerfeld, Königstrasse 20-21, Berlin C. 2.

New Zealand

April 7, 1927

57,563 Manure distributer. Leonard Isaac Howell, Valley Road, Paraparaumu, Wellington.

April 21, 1927

56,289 Diaphragm for acoustic instruments. Marconi Wireless Telegraph Co., Ltd., Marconi House, Strand, London, assignee of Norman William McLachlan, Rochester, Great Leighs, Chelmsford, both of England.

57,393 Jar closure. Henry Cuthbertson, 37 Camblin's Road, St. Martins, Herbert Henry Stubbs, 5 Woodbridge street, Cashmere, and William Stuart Long, 54 Cornwall street, St. Albans, all in Christchurch.

Chemical patents will be found on page 206. Machinery and Process Patents on pages 210-211.

Trade Marks

United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section (1) (b) are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the later act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

May 10, 1927, Act of February 20, 1905

227,501 Circle containing the representation of a foot and the words: "WITTS GLADFHEET ARCH-BILT SHOES"—shoes. Craddock-Terry Co., Lynchburg, Virginia.

227,514 "THUNDERBOLT"—tire repair boot. F. J. Hagerling, St. Louis, Missouri.

227,579 AUTO EZE—tire preservative coatings, etc. Central Laboratories Co., Wheeling, West Virginia.

227,624 TIME TO RE-TIRE?—tire and tube patches, tire repair kits, sectional airbags for tire repairing and valve pads. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

227,648 Large letter: "O" in the center of which is the word: "SUPER"—acid gloves, mittens and aprons. Norman L. Kuehn, doing business as N. L. Kuehn Co., Milwaukee, Wisconsin.

227,680 Oblong containing the words: "THE FLEXRIDGE SHOE"—shoes. The United States Shoe Co., Cincinnati, Ohio.

May 10, 1927, Act of March 19, 1920

227,701 FAIRFAX—tires. National Products Corporation of America, Chicago, Illinois.

227,708 RANDALL—raincoats, etc. Goodlow Corporation, New York, N. Y.

227,717 ASBESTOSIZED—inner tubes for pneumatic tires. The Badger Rubber Works, Milwaukee and Cudahy, Wisconsin.

May 17, 1927, Act of February 20, 1905

227,726 Representation of a little boy holding a lighted candle in one hand, the other holding a tire containing the words: "REGULAR CORD," and in the center the letter: "F"—pneumatic tires. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

227,727 Representation of a little boy holding a lighted candle in one hand, and slung across his shoulder a tire containing the word: BALLOON—tires. The Fisk Rubber Co., Chicopee Falls, Massachusetts.

227,743 Fancy design containing the word: GEM—golf balls. Arlington Rubber Co., Everett, Massachusetts.

227,808 CLARION—crystal and rubber combination mouthpieces for wind instruments. H. & A. Selmer, Inc., New York, N. Y.

227,825 SYRA-BORD—flooring. The Syra-Bord Rubber Flooring Corporation, Syracuse, New York.

227,853 Representation of a little boy holding in one hand a lighted candle, and balancing a tire on one shoulder—rubber cement. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

227,907 TRANSPORTATION—tires. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

227,946 Representation of a little boy supporting on one shoulder a tire, and holding in one hand a lighted candle, superimposed across the front of the representation is a shield containing the word: FISK—tire and tube patches and repair outfits. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

227,953 Representation of a little boy supporting on one shoulder a tire, one hand holding a lighted candle—inner tubes for pneumatic tires, tire and tube patches, tire repair kits, sectional airbag for tire repairing, tire flaps, reliners, and valve pads. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

227,956 Representation of a little boy supporting a tire on one shoulder, and holding in one hand a lighted candle, superimposed across the front of the representation, is a shield—tires. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

May 24, 1927, Act of February 20, 1905

228,025 Representation of a little boy supporting a tire on one shoulder and holding a lighted candle in one hand. Across the front of the representation is superimposed a shield—tires and inner tubes, tire and tube patches and repair kits. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

228,074 LITEX—composition soles. Mishawaka Rubber & Woolen Manufacturing Co., Mishawaka, Indiana.

228,113 AUTORAF—swimming floats. William J. Haynes, Kansas City, Missouri.

228,129 Oval containing the words: "SPORT DOGS FOR COLD FEET," "THEY ARE HOT"—overshoes. William B. Wreford, Detroit, Michigan.

228,136 VIOLET RAY—bathing caps, shoes, etc. The Asbury Mills, New York, N. Y.

228,151 RED CIRCLE—garters. Mishawaka Rubber & Woolen Manufacturing Co., Mishawaka, Indiana.

228,193 GLENGAIRN—shoes. Cambridge Rubber Co., Cambridge, Massachusetts.

228,199 Representation of a golf links, a figure in the foreground with uplifted stick, and the words: "SPORTCHIC" and "NEW YORK"—raincoats, etc. Mendelson Sportswear, Inc., New York, N. Y.

228,202 The words: "QUEEN QUALITY" and "6 STYLE 6"—boots, shoes and slippers. Thomas G. Plant Co., Boston, Massachusetts.

228,234 NAIAD—tea and household aprons, baby pants, etc. The C. E. Conover Co., New York, N. Y.

May 31, 1927, Act of February 20, 1905

228,314 The word: "SUMMER-TEX" enclosed in fancy shield—raincoats, etc. Cohen, Goldman & Co., Inc., New York, N. Y.

228,315 Square containing the words: UNITED SHIRT SHOPS—garters, suspenders, etc. United Shirt Shops, Inc., New York, N. Y.

228,330 TIME TO RE-TIRE?—rubber cement. The Fisk Rubber Co., Chicopee Falls, Massachusetts, and Cudahy, Wisconsin.

228,351 Square containing the representation of a figure of a man and the words: TON TEX—belting. Ton-Tex Corporation, Grand Rapids, Michigan.

228,389 PRESIDENT—tires and tubes. Converse Tire & Rubber Co., Malden, Massachusetts.

228,390 ALPINE—tires and tubes. Converse Tire & Rubber Co., Malden, Massachusetts.

228,416 Numeral: 4, and the word: POINT—boots and shoes. Churchill & Alden Co., Brockton, Massachusetts.

228,474 Representation of an infant crawling—baby pants. I. B. Kleinert Rubber Co., New York, N. Y.

May 31, 1927, Act of March 19, 1920

228,484 CENTRAL STATES—pneumatic tire cases and tubes. The Cooper Corporation, Cincinnati, Ohio.

Dominion of Canada

Registered

May 17, 1927

41,476 Word: "THRIFT"—tires, tubes and accessories. The T. Eaton Co., Ltd., Toronto, Ontario, and Winnipeg, Manitoba.

May 24, 1927

41,509 Word: "SEIBERLING"—general. Seiberling Rubber Co. of Canada, Ltd., Toronto, Ontario.

41,510 Diagram comprising a central letter or figure of S shape supported at the side by rectangles, the said letter or figure and the rectangles being of contrasting colors—general. Seiberling Rubber Co. of Canada, Ltd., Toronto, Ontario.

41,537 Words: "RAINY DAYSER"—cap to protect hat from rain or snow. Evernu Rubber Heel Corporation, New York, N. Y.

May 31, 1927

41,546 Series of circumferentially disposed outstanding blocks or elements approximately diamond shaped, and spaced by a series of grooves or lines which intersect each other at right angles, the blocks or elements being aligned on parallel cross planes—tires. The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ontario.

41,551 Word: "VULKAPATCH"—repair material for pneumatic tubes, hot water bottles, rubber gloves, etc. Gutta Percha & Rubber, Ltd., Toronto, Ontario.

United Kingdom

May 4, 1927

476,676 QUIKSITE—cricket, golf and hockey balls, etc. Joe Anderson, 9-15 St. John street, Perth, Scotland.

477,242 SUPARAMAC — waterproof coats and cloaks. Harold Lancelot Banks Pawson, trading as Pawsons' Rubber Stores, 31¼ Stonegate, York.

477,462 FAIRYBELLE—rubber and gutta percha goods. Herbert Temple, 145, Cheapside, London, E. C. 2.

477,717 VOLCREPE—soles. Shoe Inventions, Ltd., Ricely Works, 1, Hood street, Northampton.

478,703 SOLATEX—boots, shoes and slippers. The Wilkinson Process Rubber Co., Ltd., 9-11 Old Market Square, Kuala-Lumpur, Federated Malay States.

479,158 Fanciful representation of a dwarf and the words: "PUNCTURE PROOF PUNCH," and "HEWSON PUNCTURE PROOF TUBES LIMITED"—puncture sealing compounds. Hewson Puncture-Proof Tubes, Ltd., 230-231, Salisbury House, Finsbury Circus, London, E. C. 2.

May 11, 1927

476,417 Fancy representation holding a monogrammed shield, beneath which is a pennant bearing the words: "SEMPER SURSUM"—dental rubber. Heinrich Otto Traun, trading as Dr. Heinr. Traun & Söhne, Vormals Harburger Gummi Kamm Co., 59, Meyerstrasse, Hamburg 8, Germany.

478,088 Representation of a tire device and the word: "BILO"—rubber and gutta percha goods. Torsten Olof Lindbeck, Kanaltorget 1, Gothenburg, Sweden.

May 18, 1927

475,011 Fancy shield containing the words: "SIEMENS & HALSKE"—rubber and gutta percha goods. Siemens & Halske Aktiengesellschaft Co., 101-110, Nonnendamm-Allee, Berlin-Siemensstadt, Germany.

May 25, 1927

B473,248 SUSSEX—soles and heels, and sole and heel protectors and tips. Sussex Rubber Co., Ltd., 32, Houndsditch, London, E. 1.

475,519 Symbolic characters—rubber and gutta percha goods. Siemens & Halske Aktiengesellschaft, 101-110 Nonnendamm-Alle, Berlin-Siemensstadt, Germany.

477,548 Representation of a runner, at the back of the representation a pennant bearing the word: "MARATHON"—tires and inner tubes. Marathon Rubber Co., Inc., Akron, Ohio, U. S. A.

478,204 CONFORT BIBENDUM—rubber and gutta percha goods. Michelin et Cie, 15 Rue du Nord, Clermont-Ferrand, France, and Michelin Tyre Co., Ltd., 81, Fulham Road, Chelsea, London, S. W. 3.

479,999 BONTEX—rubber and gutta percha goods. The Avon India Rubber Co., Ltd., Rubber Works, Bath Road, Melksham, Wiltshire.

New Zealand

April 21, 1927

17,316. I.T.S.—heels. The Canadian I.T.S. Rubber Co., Ltd., West Toronto, Canada.

Designs

United States

72,606 — 72,607 — 72,608 — 72,609 — 72,610 — 72,611 — 72,612 — 72,613 — 72,614 — 72,615—72,616—72,617—72,618—72,619 Tires. Term 14 years. William E. Greer, assignor to The Akron Standard Mold Co., both of Akron, Ohio.

72,636 Tire. Term 14 years. Harold D. Reichard, assignor to The Akron Standard Mold Co., both of Akron, Ohio.

72,692 Golf ball. Term 14 years. George William Beldam, Ealing, England.

72,693 Golf ball. Term 14 years. George William Beldam, Ealing, England.

72,720 Tire. Term 14 years. Fred A. Nied, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

72,732 Tire. Term 14 years. Ward W. Sigler, assignor to The Akron Standard Mold Co., both of Akron, Ohio.

Dominion of Canada

7,557 Tire. The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ontario.

Germany

986,129 Rubber sponge with porous cloth cover. Klara Maes, née Krüger, Iserlohn.

986,501 Rubber ball for pneumatically worked signal instruments. Eugen Grill, Fischerstrasse 2, Zuffenhausen.

986,631 Rubber purse. Dietsch & Illgen, Zeulenroda.

986,894 Double texture rubberized fabric oiled on the outside. Wilhelm Hacher, Marschallstrasse 8, Chemnitz.

987,173 Gummed, flexible shoe with rubber caps. Otto Habicht, Voltastrasse 78, Frankfurt-am-Main.

987,381 Rubber gaiter. Neue Gummigamaschen G. m. b. H., Neue Jakobstrasse 8, Berlin S. 14.

987,430 Fire hose with vulcanized inserts to reinforce sides. Wilh. Kux Nachf., Bleichstrasse 2-3, Halberstadt.

987,890 Hot water bottle. Münden-Hildesheimer Gummiwaarenfabriken, Gehr. Wetzell A.-G., Hildesheim.

988,251 Rubberized fabric. Standard Para Gummifabrik, Holzberg & Co., Kom.-Ges., Gehringstrasse 37, Berlin-Weissensee.

988,264 Non-slip protection for crepe rubber soles. Firma Anton Linzen, Weimar.

988,370 Sponge rubber protectors for battery jar inserts. Richard Kelch, Kötzschenbroda i. S.

988,475 Protective tube for dental drill. Kaltenbach und Voigt, Mammonstrasse 2-3, Potsdam.

988,712 Uterine pessary. Paul Deutsch, Johannesstrasse 17, Berlin N. 24.

988,758 Anti-skid strip. Deutsche Dunlop Gummi-Compagnie A.-G., Hanau a. M.

988,928 Rubber blood pressure cuff. Firma C. Stiefenhofer, Karlsplatz 6, Munich.

989,104 Rubber tube for compressed air or water. Hoffmann & Co., G. m. b. H., Rüttenscheiderstrasse 307, Essen.

989,398 Wrapping for wheel rims. The Dunlop Rubber Co., Ltd., London. Represented by Dr. R. Wirth, C. Weihe, Dr. H. Weil, M. M. Wirth, of Frankfurt am Main, and T. R. Koehnhorn and E. Noll, Berlin S. W. 11.

989,447. Window-cleaner with semi-circular rubber strip. Gerhard Schulze-Allen, Jannenhofweg 63, Düsseldorf-Gerresheim.

989,586 Connecting border for runners, floor-covers of rubber, linoleum and similar materials. Hannoversche Gummiwerke Excelsior A.-G., Hannover-Limmer.

989,755 Sewing machine treadle with rubber mat. L. O. Dietrich, Nähmaschinenfabrik (Sewing-machine factory), Altenburg i. Th.

989,789 Heel with iron border. Carl Foppe, Rheine i. W.

989,849 Powder Puff. Ida Kaiser, née Dufner, Waldshut.

989,853 Garter. Firma Eugenie Berger, Reisewitzerstrasse 32, Dresden-Löbtau.

989,963 Rubber bottle. Friedrich Wilhelm Thiele, Springerstrasse 9, Leipzig-Gohlis.

990,013 Massive crepe rubber heel. Firma Anton Linzen, Weimar.

990,380 Armored rubber tube conductor. Kabel- und Gummiwerke A.-G., Römerstrasse 19, Aachen.

990,487 Hard rubber comb. Deutsches Gummi Kammwerk m.b.H., Ringbahnstrasse 36, Berlin-Tempelhof.

990,527 Flesh scrubber of rubber. Kurt Rietzel, Marienfelderstrasse 97, Berlin-Lichterfelde.

990,533 Mudguard for bicycles. Haguma Hannoversche Gummiabsatz-Fabrik G. m. b. H., Stadtweg 31, Hannover-Ricklingen.

990,652 Tube. Gesellschaft für Automobil-Bedarfsartikel m. b. H., Koniggrätzerstrasse 90, Berlin S. W. 11.

990,639 Overshoe. Helsingborgs Gummifabriks Aktieholag, Helsingborg, Sweden. Represented by E. Herse, Kassel-Wh., and H. Hillecke, Berlin S. W. 61.

990,787 Glove-like rubbing and massaging device. Schwelmer Gummiwaren-Gesellschaft, Schwelm i. W.

991,065 Mosaic floor covering. Kabelwerk Barmen A. G., Remscheiderstrasse 5, Barmen-R.

991,191 Pneumatic cushion tire. Continental-Caoutchouc- und Gutta-Percha-Compagnie, Vahrenwalderstrasse 100, Hannover.

991,200 Cork for bottle with rubber ring. Fritz Zippel, Herderstrasse 14, Berlin-Charlottenburg 2.

Preparation of Jelutong (Pontianak)

The paper *Karte Berichten* gives an interesting description of the collecting of jelutong in the Netherlands East Indies.

The jelutong trees grow wild in marshy lands in Borneo and Sumatra and attain extremely large dimensions. They are always found among other varieties, never alone.

The two chief varieties from which jelutong is obtained are *Dyere Lowii Hook f.* and *Dyere laxiflora Hook f.* In Sumatra, the districts Palembang and Djambi are the main sources of supply, the tree from which the latex is obtained being the *Dyere Lowii Hook f.* In Borneo both varieties are found in the marshy districts, and also about Samarinda.

Jelutong is collected by the natives exclusively who have to obtain a permit to do so first and must submit to certain terms and adhere to a specified tapping method. All this is done by the government to prevent wholesale destruction of the trees.

Tapping is hardly ever undertaken in the dry season. The utensils employed by tappers are extremely primitive and consist of a kind of hatchet, an empty kerosene tin and a wooden scraper. With the hatchet, the bark is removed in a circle to a width of 20 cc.m. (about 8 inches) at a height of about 1 m. (approximately 40 inches). In chopping off the bark care is taken not to reach the cambium.

As soon as the wounds are made the latex rapidly exudes, but it is not collected until about 30 to 40 trees, in some districts as many as 50 to 80 trees, have been similarly treated. Then the latex from the first tree is collected. To prevent premature coagulation one-third part of water is added to the latex. The next time the bark above the wound is chopped away to a width of 2 to 3 fingers' breadth when the latex begins to flow again. This is continued until the tapper reaches a height of about 2 m.

In preparing jelutong one of two methods is usually followed. In the one a small quantity of alum is dissolved in one liter of warm water and poured into the latex. After stirring 10 minutes coagulation sets in and then double the amount of water as of latex is added and stirred for two hours to get a proper mixing.

The second system is similar only instead of alum a small quantity of plaster of paris is mixed with one liter of cold water and about ½-liter of petroleum is added 10 minutes after the plaster and water have been stirred into the latex.

The cask is then kept in a cool place over-night. In the morning the water is allowed to run off and the coagulum, over which warm water has been poured, is kneaded with a bottle until it is hard. The jelutong is then kept under water until shipped.

The area under jelutong is estimated at 1,800,000 hectares with about four tappable trees per hectare, giving a possible total of about 7,200,000 trees. The annual yield of 50 trees is about 19 kilos, so that the total annual production may come to 2,700 tons. During 1921-24 the average output per year was 1,500 tons.

Jelutong contains 8 to 15 per cent rubber, 25 to 46 per cent resin, while the rest is chiefly moisture. Palembang jelutong has the highest rubber content, 15-18 per cent; then comes Banjermassin with 12 to 14 per cent. Pontianak jelutong has a still lower rubber content. It appears on the market in square or cylindrical blocks varying in color from whitey-gray to blue.

Exports of jelutong from Palembang in 1925 were 193,000 kilos, from Southern and Eastern Division of Borneo, 1,090,000 kilos, from Western division of Borneo, 138,000 kilos. It is interesting to note that Palembang exports in 1915 were as high as 4,122,615 kilos; while Southern and Eastern Borneo shipped as much as 6,264,492 kilos in 1917 and Western Borneo shipped 707,217 kilos in the same year.

Labels

United States

31,954 STATITE TUBE PATCH. Tire and tube repair outfits. Statite Rubber Products Co., Covington, Kentucky. Published September 1, 1926.

31,986 COLLEGIATE GARTER. Garters. Sturm & Scheinberg, New York, N. Y. Published March 15, 1925.

32,033 GORILLA RUBBER PATCH. Patches. Fannie L. McCandless, doing business as A. C. McCandless & Son Manufacturing Co., Wichita, Kansas.

32,082 KERRY PATCH. Tire patch. Albert E. Schlesinger, doing business as Kerry Tube & Tire Patch Co., St. Louis, Missouri.

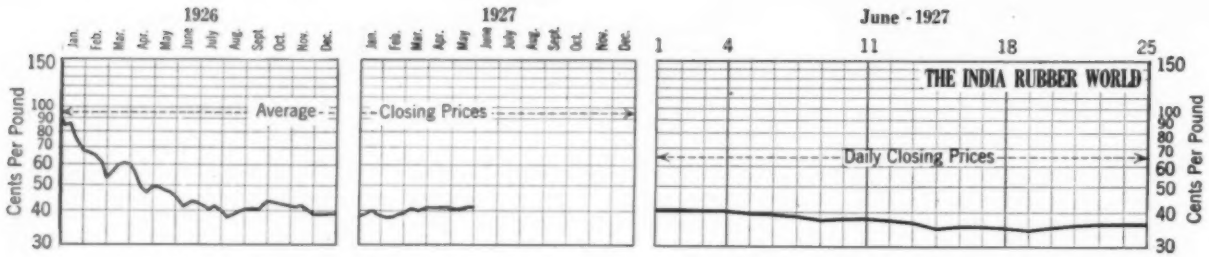
32,141 SANTA. Ring game. Schacht Rubber Manufacturing Co., Huntington, Indiana.

32,142 CLOWN. Ring game. Schacht Rubber Manufacturing Co., Huntington, Indiana.

32,143 PUMPKIN FACE. Ring game. Schacht Rubber Manufacturing Co., Huntington, Indiana.

32,144 JACK RABBIT. Ring game. Schacht Rubber Manufacturing Co., Huntington, Indiana.

32,187 THUNDERBOLT. Tire patch. Fred J. Hagerling, St. Louis, Missouri.



Ratio Graph of New York Closing Prices of Spot Ribbed Smoked Sheets

Review of the Crude Rubber Market

New York Outside Market

THE long period of dullness in the market was sharply varied early in June by sagging prices, which depressed spot ribbed smoked sheets from 40½ cents on June 1 to 35 cents on June 15, at which point the market gained support and slowly reacted upward. On June 25 the price was 36¼ cents.

The break in prices was attributed to a number of causes, including fear of a general tire price reduction, continued lack of factory buying, large stocks available, in spite of restriction of exports to 60 per cent of standard. The upward reaction was credited to the support of the crude rubber buying organization, commonly designated as the "Pool." The agreement and credit under which this combination operates was recently extended to June 1, 1928, a period of one year beyond the limit of the original agreement. It is believed that this extension of credit served to benefit the market situation, and that the operations of the buying organization were credited with starting the upward movement from the 35 cent level.

The following opinion on the current market situation was expressed by Robert L. Baird, vice president of Baird Rubber Trading Co., Inc., New York, N. Y.

The present situation was obviously brought about by the restriction scheme ceasing to function. Standard production is kept too high and too many additional export credits are allowed. This nullifies the 60 per cent restriction. In the meantime stocks are mounting and manufacturers are running into a quieter production period. The weather, which in March promised to be favorable, has been disappointing. Tire inventories have advanced and the season is behind almost a month's sales.

Crude rubber has dropped 5 cents a pound, some 12 to 15 per cent. Has this drop sufficiently taken care of the disappointing conditions mentioned? Will artificial support at 35 or 36 cents tide the situation over until better conditions develop in the rubber industry?

The whole situation depends upon Great Britain's good faith in tightening up on the working of their restriction scheme. In our view it is to their advantage to do so.

Opposition to the continuance of restriction has been increasing among British rubber growers. They complain that business is being lost to the Dutch. A big rise in exports of rubber from the Dutch East Indies simultaneously with a drop in British exports indicates that some transfer of business is taking place.

Importations of all grades in May were 36,569 tons, compared with 30,411 tons one year ago. Plantation arrivals for May were 33,735 tons, compared with 27,915 tons one years ago. Total importations of plantation rubber for five months ended May 31, were 180,664 tons, compared with 167,062 tons for the corresponding period of 1926. Total importations of all grades of rubber for the five months ended May 31 were 193,656 tons, compared with 178,530 tons for the corresponding period of 1926.

RUBBER AFLOAT TO THE UNITED STATES
(Figures in Long Tons.)

Week Ended	British Malaya	Ceylon	East Indies	London and Liverpool	Totals
May 28	4,687	546	1,540	777	7,550
June 4	6,088	344	2,432	454	9,318
June 11	3,492	486	781	287	5,046
June 18	4,889	173	1,903	505	7,470
June 25	5,256	922	1,331	2,971	10,480

New York arrivals of crude rubber, June 1 to 22 were 20,938 tons. Arrivals for the full month are estimated at 27,500 tons, compared with 35,500 tons for May.

The week ended June 4 the dull condition was marked by lack of activity up to Wednesday when the prices on the Rubber Exchange broke ¾ to 1 cent due to heavy arrivals and absence of factory support. The fact of restriction to 60 per cent of standard had no apparent effect on buyers' ideas because of the large stocks available.

The week ended June 11 the market was much depressed. Prices originated in New York and London followed. There was no factory buying interest because of the expectation day by day of lower prices.

The market for the week ended June 18 was continuously excited and prices were off about 2 to 2½ cents all around. News of continuation of the pool served to steady the market.

During the week ended July 25 the market recovered slightly from its low of the week before due to strong dealers' support. Factories still declined to buy except for actual manufacturing needs. The outlook was for gradually lowering prices.

Paras declined in sympathy with plantations and remained dull and weak. Balatas were dull and easier.

New York Outside Market—Spot Closing Rubber Prices—Cents Per Pounds

PLANTATIONS	May, 1927								June, 1927															
Sheet	23	24	25	26	27	28†	30*	31	1	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18
Ribbed smoked	41	41⅛	41	41	41	..	..	41	40½	40¼	40⅛	40⅛	39⅝	39½	38⅞	37⅝	37¼	37⅛	37½	36⅝	35	35⅛	35⅛	35¼
Crepe																								
First latex	41⅝	41⅝	41⅝	41½	41½	..	..	41⅜	41⅛	40¾	40⅝	40½	40	40	39½	38	38	38⅛	37¾	36⅞	35¼	35⅝	35⅝	35½
No. 2 blanket	38¼	38⅝	38½	38½	38⅜	..	..	38¼	38½	38⅛	38	37¾	37⅜	37⅛	36¾	35⅛	35⅝	35¾	35⅛	34¾	32½	32⅝	32¾	32⅞
No. 3 blanket	38⅛	38⅜	38⅛	38	38	..	..	37⅞	37¾	37⅜	37⅜	37⅜	37⅛	36⅝	36⅜	34¾	35⅛	35⅛	34⅜	33¾	32½	32⅝	32½	32⅜
No. 4 blanket	37⅜	37½	37⅝	37⅜	37½	..	..	37⅛	36⅞	36⅝	36¾	36¾	36⅛	36⅛	35¾	34⅛	34½	34⅝	34⅝	33⅜	31⅜	31½	31⅝	31⅝
Thin clean brown	38⅛	38⅝	38⅛	38⅛	38⅛	..	..	38⅛	37⅞	37½	37½	37½	37⅛	37	36⅜	35⅛	35⅛	35⅛	35	33⅜	32⅝	32½	32½	32⅝
Rolled brown	35¾	35⅝	35¾	35¾	35¾	..	..	35⅝	35⅜	35⅜	35⅜	35⅝	35⅝	34⅜	34½	32⅝	32½	33	32⅜	32½	30½	30¼	30½	30½
Off latex	41	41⅛	40⅞	40⅞	40⅞	..	..	40¾	40¾	40¼	40⅛	40⅛	39¾	39½	38¾	37½	37½	37¾	37⅝	36½	35	35⅛	35¼	35¼

*Holiday. †No market.

New York Quotations

Following are the New York spot and future rubber quotations for one year ago, one month ago and June 25, the current date:

Plantation Hevea	June 26, 1926	May 24, 1927	June 25, 1927
Rubber latex (Hevea)...*gal.*	$1.80 @	$1.50 @	$1.50 @
CREPE			
First latex crepe, spot....	.43 @	.41½@.41⅞	.37 @
July	.41½@	.41¾@	.37 @.37⅛
August-September	.42 @	.42¼@.42½	.37¼@
October-December	.42½@.43½	.42¾@.43	.37⅜@.37⅝
January-March	.43½@.44½	.43¼@.43½	.38 @
Off latex, spot	.42 @.42½	.41½@	.36½@.36¾
Amber No. 2, spot	.37⅛@	.39 @	.33½@.34
July	.37½@.38	.39¼@	.34 @
August-September	.38 @.39	.39½@	.34 @
October-December	.39 @	.39¾@	.34½@
January-March	.38½@.39½	@	.34½@
Amber No. 3, spot	.36½@.37	.38¼@.38½	.32½@
Brown, thin, clean	.37 @.38	.38½@.38¾	.32 @
Brown, specky	.35 @.36	.38 @	.31½@
Brown, roll	.33 @.34	.36¼@	.30 @
Sole crepe	@	@	@
Sheet			
Ribbed, smoked, spot	.42½@	.41 @	.36½@.36¾
July	.41 @	.41¼@	.36½@
August-September	.41½@	.42 @.42⅛	.36⅞@
October-December	.42½@.42½	.42¾@	.37½@
January-March	.42½@.43	.43 @	.37¾@
East Indian			
PONTIANAK			
Banjermassin	.15 @.16	.09 @	.09¾@
Pressed block	.26 @.28	.16 @	.16 @
Sarawak	.16½@	.09 @	.09¾@
South American			
PARAS			
Upriver, fine	.38 @	.37 @	.31 @
Upriver, fine	*.53 @	*.45½@	*.42 @
Upriver, medium	.33 @	.33 @	.26 @
Upriver, coarse	.22½@	.26 @	.21 @
Upriver, coarse	*.40 @	*.38 @	*.34 @
Islands, fine	.32 @	.33 @	.39 @
Islands, fine	*.52 @	*.43 @	*.40 @
Acre, Bolivian, fine	.39 @	.38 @	.32 @
Acre, Bolivian, fine	*.54 @	*.46 @	.43 @
Beni, Bolivian	.39 @	.38 @	.32 @
Madeira, fine	.39 @	.37 @	.31 @
Peruvian, fine	.37 @	.36 @	.30½@
Tapajos, fine	.35 @	.35 @	.30 @
CAUCHO			
Upper Caucho ball	.24 @	.27 @	.22 @
Upper Caucho ball	*.40 @	*.39 @	*.34 @
Lower Caucho ball	.23 @	.25 @	.19½@
Maniçobas			
Ceará negro heads	.40 @	.24 @	.22 @
Ceará scrap	.20 @	.12 @	.12 @
Manicoba, 30% guarantee	.37 @	.23 @	.21 @
Mangabiera, thin sheet	.40 @	.23 @	.21 @
Centrals			
Central scrap	.22 @.24	.25 @	.22½@
Central wet sheet	.12 @.15	.17 @	.17 @
Corinto scrap	.22 @.24	.25 @	.22 @
Esmeralda sausage	.22 @.24	.25 @	.22 @
Guayule			
Duro, washed and dried	.33 @	.33 @	.30 @
Gutta Percha			
Gutta Siak	.34 @ .36	.20½@	.22 @
Gutta Soh	.26 @ .28	.38 @	.43 @
Red Macassar	3.00 @ 3.50	3.00 @	3.20 @
Balata			
Block, Ciudad Bolivar	.58 @ .60	.38 @	.37 @
Colombia	.40 @ .42	.36 @	.36 @
Manaos block	@	.42 @	.41 @
Panama	.38 @ .40	.36 @	.36 @
Surinam, sheet	.75 @ .80	.62 @	.60 @
amber	.80 @ .85	.66 @	.64 @
Chicle			
Honduras	‡.64 @	‡.65 @	‡.68 @
Yucatan, fine	‡.65 @	‡.65 @	‡.68 @

* Washed and dried crepe. Shipment from Brazil.
† Nominal. ‡ Duty paid.

New York Open Market—Spot Closing Rubber Prices—Cents, Per Pound

Plantations	June, 1927 20	21	22	23	24	25
Sheet						
Ribbed smoked	34⅞	35½	36⅛	36⅛	36⅜	36⅜
Crepe						
First latex	35⅛	35¾	36⅜	36⅞	36¾	37⅛
No. 2 blanket	32⅜	32⅝	33½	33⅝	33⅝	33⅞
No. 3 blanket	31⅞	32¼	33⅛	33¼	33⅛	33½
No. 4 blanket	31½	31⅝	32¼	32½	32½	32½
Thin clean brown	32⅛	32¼	33¼	33½	33½	33⅝
Rolled brown	30¾	30⅜	30¾	31⅛	31⅛	31¼
Off latex	34⅜	35¼	36⅛	36½	36⅜	36¾

London

In June the market was generally dull, weak and irregular, following rather than leading New York in the pronounced decline that occurred during the first three weeks of June. The crude rubber price situation has renewed the discussion of effects of continuing the British policy of restriction. Sir George Maxwell, noted economist, advocates in the *Financial Times* that restriction be abandoned after the ratio has remained steady at 100 per cent for a period of three consecutive quarters. The fall in rubber prices is not expected to influence the Government in the matter of restriction. The reasons for the decrease in prices are growth of the Dutch East Indian output and the availability of unused coupons which nullified the lowered export rate from the Far East.

While the British Government reaffirmed in the House of Commons June 17 its intention of continuing to restrict rubber imports, nothing was said about modification of the pivotal price. As a result of the decline on the market the prediction was made that the price would be reduced.

The *London Times* on June 20 declared, regarding restriction: "The longer its existence is continued the greater the threat against the ultimate position of the British rubber industry." The restriction act is being assailed steadily in the London press, which is voicing the growing protest against its continuance.

London stocks did not vary greatly from 67,000 tons between May 28 and June 18 although the tendency was downward and a drop of 2,408 tons appeared in the report of June 25. The weekly record is as follows: May 28, 67,054 tons; June 4, 67,105 tons; June 11, 67,454 tons; June 18, 66,894 tons; June 25, 64,486 tons.

Singapore

The market for the past month was featured by weak and declining prices. On June 10 the local market, following the lead of New York and London, declined from ¾ to ⅞ pence, June closing at 17¾ pence. Again on June 16 heavy liquidation followed the sharp declines in the western markets and prices closed ½ to ¾ pence lower, with June at 16⅝ pence sellers. June 20 the market was dull. Later firmer closing on the western markets caused sellers to withdraw.

British Malaya

RUBBER EXPORTS

An official cablegram from Singapore to the Malay States Information Agency, 88 Cannon street, London, E. C. 4, England, states that the amount of rubber exported from British Malaya during the month of May last totaled 31,393 tons. The amount of rubber imported was 15,491 tons, of which 12,741 tons were declared as wet rubber. The following are comparative statistics:

	1926		1927	
	Gross Exports Tons	Foreign Imports Tons	Gross Exports Tons	Foreign Imports Tons
January	30,452	10,237	34,946	14,995
February	30,440	8,306	27,528	11,697
March	35,012	14,800	41,346	17,462
April	23,727	10,565	29,041	13,069
May	31,231	10,604	31,393	15,491
Totals	150,862	54,512	164,254	72,714

Note—The above figures represent the totals compiled from declarations received up to the last day of the month for export from and import to all ports of British Malaya and not necessarily the actual quantity shipped or landed during that month.

DISTRIBUTION

The following is a comparative return of distribution of shipments during the months of April and May, 1927:

	April, 1927 Tons	May, 1927 Tons
United Kingdom	4,636	6,423
United States of America	21,397	21,879
Continent of Europe	1,490	1,694
British Possessions	562	458
Japan	930	924
Other foreign countries	26	15
Totals	29,041	31,393

Low and High New York Spot Prices

Plantations	June 1927*	1926	1925
First latex crepe	$0.35½@$0.41	$0.41½@$0.45	$0.69 @$0.85
Smoked sheet, ribbed	.34¾@ .40½	.41½@ .45	.70 @ .87
PARAS			
Upriver, fine	.30¼@ .37	.34 @ .37	.52 @ .71
Upriver, coarse	.21 @ .25	.20 @ .24½	.41 @ .54
Islands, fine	.26¾@ .31	.34 @ .35	.48½@ .62½
Cametá		.21 @ .24	.25½@ .37

*Figured to June 18, 1927.

The Rubber Exchange of New York, Inc.

Trading on the Rubber Exchange from May 26 to June 25, inclusive, resulted in the sale of 15,362 contracts equivalent to 38,405 long tons. This period included the day of record transactions, June 9 when 1,667 contracts were sold, equivalent to 4,167½ long tons. There were five days in which transactions exceeded 1,000 contracts.

Early in the month there was nothing in the statistical position of the rubber market that indicated the break that was soon to occur. In May the market was dull but firm with sufficient buying support to maintain price levels. June 1 the closing price of spot ribs was 40.2 cents sellers and the market became easier with much increase of activity and downward tendency in prices. Some hedging orders were executed for the account of tire dealers. Operators in foreign markets utilized the facilities of the Exchange by selling against stocks in the absence of customers orders, while manufacturers sold against stocks bought at higher levels and speculators sold, expecting to cover at a profit. The decline continued because of lack of buying support and on June 16 reached 34.6 cents for spot ribs in a very active market. The selling movement met with considerable resistance. Trading was principally professional in characteristically excited sessions. Buying support was finally successful in stopping further decline.

On June 16 the market assumed an upward trend. Sales of June smoked ribs ceased June 23 at 36.5 cents. On June 25 the July position was quoted at 36.7 cents.

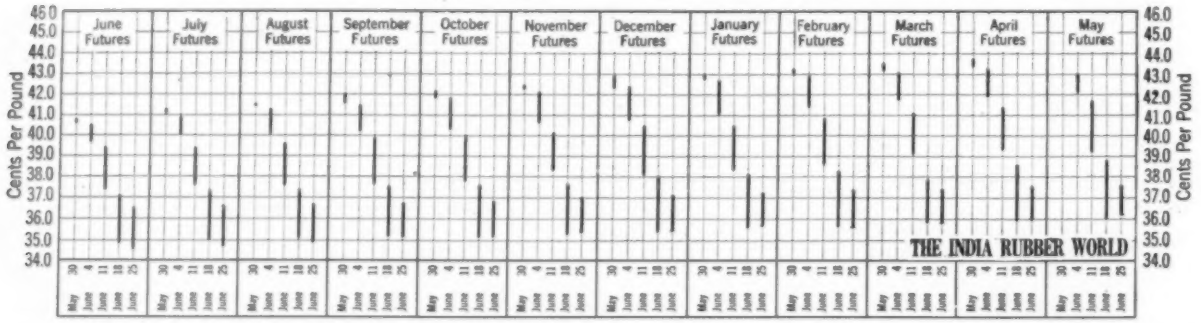
The usefulness of the Exchange was demonstrated by the readiness with which rubber manufacturers availed themselves of its facilities for selling forward delivery. Also by the considerable business done for European houses and eastern shippers. In this connection the remarks of Henderson Brothers & Co., Inc., New York, are very worthy of consideration.

"Since May 31 the price of crude rubber has declined about 7 cents a pound. On that date stocks in United States totaled 94,000 tons and stocks afloat to United States were 44,000 tons.

"These stocks by the decline mentioned depreciated about $21,000,000 in value and those who owned them suffered that loss, unless they previously insured their supplies against a price decline. Modern merchandising methods include provisions for securing price insurance on rubber, as well as other market commodities. The sale of contracts for future delivery on the Rubber Exchange provides manufacturers and dealers who carry stocks of rubber with complete protection against price declines."

The Board of Governors of the Rubber Exchange approved June 18 a scale of price differentials between the various grades of Hevea plantation rubber, which shall prevail on all deliveries made during July, 1927, against contracts entered into on or after June 21, 1926, as follows: Off quality first latex crepe at one-half cent per pound; good F. A. Q. ribbed smoked sheets at 17 cents per pound; ordinary F. A. Q. ribbed smoked sheets at one and one-half cent per pound.

New York Rubber Exchange—High and Low Monthly Futures—Cents Per Pound



The Rubber Exchange of New York, Inc.

Daily Market Futures—Ribbed Smoked Sheets—Closing Prices—Cents Per Pound

1927	May 23	24	25	26	27	28*	30*	31	June 1	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18	20	21	22	23	24	25
May.	40.6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
June.	40.8	40.8	40.8	40.6	40.6	...	...	40.5	40.1	40.0	39.9	39.7	39.4	39.2	38.8	37.4	37.4	37.5	37.1	36.7	35.1	35.4	35.2	34.9	34.6	35.2	36.3	36.5	36.5	36.7
July.	41.2	41.3	41.2	41.1	41.1	...	...	40.9	40.3	40.2	40.1	40.0	39.4	39.4	38.9	37.6	37.6	37.7	37.3	36.8	35.0	35.4	35.3	35.1	34.7	35.4	36.3	36.6	36.7	36.7
Aug..	41.4	41.5	41.5	41.4	41.4	...	...	41.3	40.7	40.4	40.3	40.1	39.6	39.4	39.0	37.6	37.6	37.7	37.3	36.9	35.1	35.4	35.4	35.1	34.9	35.5	36.4	36.7	36.7	36.9
Sept.	41.8	41.9	41.9	41.7	41.6	...	...	41.5	41.0	40.6	40.5	40.2	39.9	39.8	39.1	37.7	37.8	38.0	37.5	37.0	35.2	35.5	35.5	35.4	35.2	35.8	36.7	36.8	36.8	37.1
Oct..	42.2	42.2	42.1	41.8	41.8	...	...	41.8	41.1	40.8	40.6	40.3	40.0	39.9	39.2	37.8	38.0	38.1	37.6	37.0	35.2	35.6	35.8	35.5	35.2	36.0	36.8	36.8	36.8	37.2
Nov.	42.3	42.4	42.3	42.3	42.3	...	...	42.1	41.4	41.0	40.8	40.6	40.1	40.1	39.3	38.6	38.3	38.3	37.7	37.2	35.3	35.7	35.8	35.7	35.4	36.1	36 9	37.0	36.9	37.3
Dec.	42.6	42.6	42.8	42.5	42.4	...	...	42.4	41.6	41.1	40.9	40.8	40.5	40.4	39.6	38.1	38.5	38.4	38.0	37.3	35.4	35.9	35.8	35.7	35.5	36.2	37.0	37.1	37.0	37.3
1928																														
Jan..	42.8	42.9	43.0	42.8	42.8	...	...	42.7	41.9	41.5	41.1	41.1	40.5	40.5	39.8	38.4	38.7	38.7	38.1	37.5	35.6	36.1	35.9	36.0	35.7	36.5	37.0	37.2	.....	
Feb..	43.0	43.2	43.2	43.1	43.0	...	...	42.9	42.2	41.8	41.5	41.4	40.8	40.8	40.1	38.6	38.9	38.9	38.3	37.7	35.7	36.2	36.1	36.3	35.7	36.6	37.1	37.3	37.1	37.4
Mar.	43.2	43.5	43.4	43.3	43.2	...	...	43.1	42.5	42.1	41.9	41.7	41.1	41.1	40.3	38.8	39.1	39.1	38.4	37.9	35.8	36.3	36.3	36.6	35.8	36.7	37.1	37.4	37.2	37.4
Apr..	43.4	43.7	43.6	43.6	43.4	...	...	43.3	42.8	42.3	42.1	41.9	41.4	41.4	40.5	39.0	39.3	39.3	38.6	38.1	35.9	36.4	36.4	36.4	36.0	36.8	37.3	37.5	37.3	37.5
May.	...	...	...	...	...	...	...	...	43.0	42.6	42.4	42.1	41.7	41.7	40.7	39.2	39.5	39.5	38.8	38.3	36.0	36.5	36.5	36.5	36.2	36.9	37.5	37.6	37.4	37.6

*Holiday.

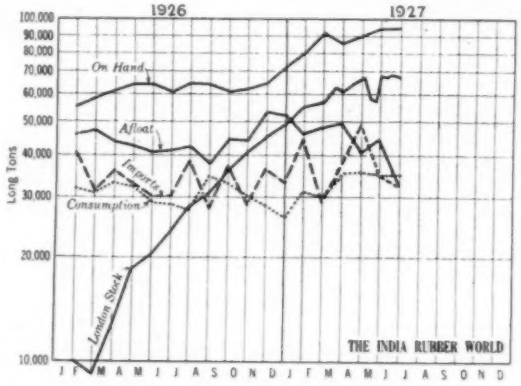
The following crude rubber importers, dealers, and brokers are listed in our Buyers' Directory. For complete information see Index of Advertisers on Page 100

Araujo, J. G. & Co., Manaos, Brazil.
Astlett, H. A., & Co., New York, N. Y.
Baird Rubber & Trading Co., New York, N. Y.
Buckleton & Co., Ltd., Liverpool, England.
Chalfin, Joseph, & Co., Inc., New York, N. Y.
Chipman, R. L., New York, N. Y.
Dunbar, F. W., & Co., Inc., New York, N. Y.
Dunbar, J. Frank, Co., Inc., New York, N. Y.
Hankin, George, & Co., London, England.
Hardy, R. S., Co., New York, N. Y.
Henderson Brothers & Co., Inc., New York, N. Y.
Hentz, H. & Co., New York, N. Y.
Hirsch, Adolph, & Co., New York, N. Y.
Jacoby, Ernest, Boston, Massachusetts.
Littlejohn & Co., Inc., New York, N. Y.
Muehlstein, H. & Co., New York, N. Y.
Nordmann, Rossmann & Co., Hamburg, Germany.
Wilson, Charles T., Co., Inc., New York, N. Y.

Imports, Consumption and Stocks

The accompanying graph covers the crude rubber supply, consumption and stocks for 1926 and the first six months of 1927.

Stocks on hand in the United States advanced from 92,800 tons May 1 to 94,600 tons June 1. Imports for May exceeded



U. S. Imports, Consumption, Stocks, 1926-27

estimates and totaled 36,569 tons and for June are estimated at 32,000 tons. Consumption in May was 34,590 tons or only 600 tons above the estimate. London stocks during the month averaged around 67,000 tons, recovering the level of April 30.

UNITED STATES CRUDE RUBBER IMPORTS, CONSUMPTION AND STOCKS

			Stocks			Singapore and
1925	Imports Tons	Consumption Tons	On Hand† Tons	Afloat† Tons	London Tons	Penang Tons†
Twelve months...	384,837	389,136	51,000*	48,000*	.....	.....
1926						
Twelve months...	411,900	358,415	72,510*	52,019*	.....	.....
1927						
January.....	45,736	31,500	76,171	45,218	54,786	26,443
February.....	29,446	29,000	76,000	48,000	56,962	26,766
March.....	39,500	36,100	91,086	49,597	63,167	27,844
April	48,700	35,900	92,800	39,000	67,034	24,543
May	36,569	34,590	94,600	44,200	56,668	25,133
June 25 (estimated)	32,000	33,000	95,000	33,000	00,000	.....

* December 31, 1925 and 1926.
† The first of each month.

Ceylon Rubber Exports from Jan. 1 to March 29, 1927

	Tons
To United Kingdom	4,310.08
Continent	643.03
Australia	260.44
America	11,488.09
Egypt	3.00
Africa	24.86
India	4.98
Japan	50.61
Total	16,785.09
For the same period last year	13,878.14

CEYLON ANNUAL EXPORTS, 1921-1926

	Tons
For the year 1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14
1921	40,210.31

Plantation Rubber Exports from Malaya*

January 1 to April 30, 1927

	From Singapore Tons	From Penang Tons	From Malacca Tons
To United Kingdom.....	3,305.84	4,191.79	3,323.10
British Possessions...	1,476.76	37.10	28.16
Continent of Europe..	4,000.12	828.20	994.12
United States	55,015.52	10,534.89	4,231.69
Japan	4,003.97	1,261.00	1,011.00
Other Countries.....	22.59	.....	.....
Totals	67,824.80	16,852.98	9,588.07

* Excluding all foreign transhipment.

Reclaimed Rubber Market

Reclaiming plants are operating at capacity, although the demand from rubber manufacturers has moderated somewhat in the past month, due in part, possibly, to the weakness of crude rubber prices. It is not probable, however, that the differential between the price of crude rubber and that of tire reclaim, for example, will diminish sufficiently to eliminate the economy of the latter in actual rubber working.

Auto tire grades have declined ½ cent. High tensiles remain unchanged. Shoe reclaim is down ⅛ to ¼ cent. No. 2 tubes are quoted ½ cent down from last month. In the miscellaneous class truck tire grades have dropped ½ cent.

New York Quotations

June 25, 1927

	Specific Gravity	Price Per Pound
Auto Tire		
Black	1.21	$0.08 @$0.08½
Black, washed	1.18	.10 @ .10½
Black selected tires	1.20	.09 @ .09½
Dark gray	1.35	.12 @ .12½
Light gray	1.38	.13 @ .13¼
White	1.40	.15 @ .16
High Tensile		
Super-reclaim, No. 1 Black	1.20	.17½ @ .18
No. 2 Black	1.20	.14½ @ .15
High tensile red	1.20	.15 @ .15½
Shoe		
Unwashed	1.60	.08⅛ @ .08⅜
Washed	1.50	.10¼ @ .11
Tube		
No. 1	1.00	.17½ @ .18
No. 2	1.18	.13¼ @ .14
Miscellaneous		
Red	1.35	.15 @ .15½
Truck tire, heavy gravity	1.55	.07¾ @ .08¼
Truck tire, light gravity	1.40	.08¼ @ .08¾
Mechanical blends	1.60	.07 @ .08

EXPORTS FROM BRITISH GUIANA OF BALATA HAVE DECLINED FROM a total of 499,121 pounds for the period extending from January 1 to May 15, 1926, to 160,844 pounds for the corresponding period of 1927. Shipments of rubber, however, have advanced for the 1927 period to 19,472 pounds, as against the 1926 figure of 14,823 pounds.

The following reclaimed rubber dealers are listed in our Buyers' Directory. For complete information see Index of Advertisers on Page 100.

Bloomingdale Rubber Co., New York, N. Y.
Central Rubber Reclaiming Co., Findlay, Ohio.
Clapp, E. H., Rubber Co., Boston, Massachusetts.
Defiance Rubber Co., Defiance, Ohio.
Manhattan Rubber Manufacturing Co., Passaic, New Jersey.
Nearpara Rubber Co., Trenton, New Jersey.
New Jersey Rubber Co., Lambertville, New Jersey.
Pequanoc Rubber Co., Butler, New Jersey.
Philadelphia Rubber Works, Philadelphia, Pennsylvania.
Rubber Regenerating Co., Naugatuck, Connecticut.
Somerset Rubber Reclaiming Works, New Brunswick, New Jersey.
Stedman Rubber Products Co., South Braintree, Massachusetts.
U. S. Rubber Reclaiming Co., Inc., New York, N. Y.
Vulcan Recovery Co., Trenton, New Jersey.
Xylos Rubber Co., Akron, Ohio.

The Market for Rubber Scrap

Price developments in the crude rubber market in June have tended to weaken the market for rubber scrap. Tire and other scrap collections are fair. Prices generally have declined except in the case of hard rubber and red and white mechanical grades of rubber scrapi

AIR BRAKE HOSE. The demand for air brake hose continues good. The ordinary fell off from $7 to $8 a ton, while regular soft was unchanged at $15 a ton.

BOOTS AND SHOES. The market on these grades continues dull, due in part to the reduced call for shoe reclaim, particularly in the topping division of the industry.

INNER TUBES. The call for inner tube scrap continues fair. The prices have sagged considerably under those prevailing a month ago on both floating and compound. Red tubes remain unchanged.

TIRES. Tire collections continue fair. Consumption by reclaimers is maintained at high tonnages, as tires are the main dependence of the reclaimer. Prices have declined only in moderate degree on some grades.

Quotations for Carload Lots

June 25, 1927

Boots and Shoes			
Boots and shoes, black	*lb.*	$0.01¾ @	$0.02
Red and white	*lb.*	.00¾ @	.01
Trimmed arctics, black	*lb.*	.00¾ @	.00⅞
Untrimmed arctics	*lb.*	.00¾ @	.00⅞
Tennis shoes and soles	*lb.*	.01 @	
Hard Rubber			
No. 1 hard rubber	*lb.*	.10 @	.10½
Battery jars, black compound	*lb.*	.01⅞ @	.02
Inner Tubes			
No. 1, floating	*lb.*	.07 @	.07¼
No. 2, compounded	*lb.*	.05¼ @	.05½
Red	*lb.*	.06 @	.06¼
Mechanicals			
Mixed black scrap	*lb.*	.01 @	
Heels	*lb.*	.00½ @	.00⅝
Hose, air-brake	*ton*	25.00 @	28.00
regular soft	*ton*	15.00 @	
No. 1 red	*lb.*	.01¾ @	.01⅞
No. 2 red	*lb.*	.01 @	
White, druggists' sundries	*lb.*	.03½ @	
Mechanical	*lb.*	.01½ @	.01⅝
Mixed tubes	*lb.*	.05 @	.05¼
Tires			
Pneumatic Standard—			
Mixed auto tires with beads	*ton*	24.00 @	24.50
Beadless	*ton*	34.00 @	34.50
White auto tires with beads	*ton*	40.00 @	42.00
Beadless	*ton*	50.00 @	52.00
Mixed auto peelings	*ton*	30.00 @	32.00
Solid—			
Mixed motor truck, clean	*ton*	26.00 @	28.00

IMPORTS INTO BRITISH SOUTH AFRICA HAVE SHOWN A considerable increase during the first half of 1926 as compared with the corresponding six months of 1925. Rubber represents one of the leading commodities imported, according to *Commerce Reports*, the value for January-June, 1926, being £503,751 as against £405,010 for the first half of 1925.

The following scrap rubber dealers are listed in our Buyers' Directory. For complete information see Index of Advertisers on Page 100.

Birkenstein, S., & Sons, Chicago, Illinois.
Chalfin, Joseph, & Co., Inc., New York, N. Y.
Cummings, Wm. H., & Sons, New York, N. Y.
Muehlstein, H., & Co., Inc., New York, N. Y.
Norton, M., & Co., Medford, Massachusetts.
Schnurmann, J., London, England.
Weber, Hermann, Hoboken, New Jersey.

United States Rubber Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	March, 1927		Three Months Ended March, 1927	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	79,552,871	$28,693,016	240,110,214	$88,556,992
Balata	116,273	44,216	316,058	110,859
Jelutong or Pontianak	659,885	105,994	3,936,733	691,883
Gutta percha	167,750	46,227	785,965	163,086
Guayule	1,019,740	253,988	2,628,888	637,807
Rubber scrap	2,319,363	47,041	6,263,462	244,998
Totals	83,836,682	$29,190,482	254,041,320	$90,405,625
Chicle *dutiable*	1,960,376	$959,109	5,019,770	$2,491,056
MANUFACTURED—*dutiable*				
Rubber belting	64,469	$44,778	192,283	$117,346
Rubber tires	138	3,651	480	12,029
Other manufactures of rubber	.....	138,597	.....	358,803
Totals	64,607	$187,026	192,763	$488,178

EXPORTS OF FOREIGN MERCHANDISE

RUBBER AND MANUFACTURES				
Crude rubber	6,189,486	$3,249,665	15,097,702	$6,971,696
Balata	14,775	5,756	25,489	10,637
Gutta percha and rubber substitutes and scrap	11,340	1,044	22,485	2,127
Rubber manufactures	.....	59,131	.....	100,525
Totals	6,215,601	$3,315,596	15,145,676	$7,084,985

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED				
India rubber				
Reclaimed	1,758,381	$160,568	4,886,474	$538,516
Scrap and old	2,469,632	175,089	6,233,167	400,538
Footwear				
Boots *pairs*	26,918	85,937	116,514	320,471
Shoes *pairs*	78,445	64,233	240,669	207,877
Canvas shoes with rubber soles *pairs*	465,742	301,582	1,222,219	852,345
Rubber water bottles and fountain syringes *number*	22,987	13,916	69,696	42,322
Rubber gloves *doz. pairs*	6,602	23,238	16,904	57,180
Other druggists' rubber sundries	.....	43,054	.....	107,075
Bathing caps *doz.*	31,882	55,539	54,830	108,923
Hard rubber goods				
Electrical hard rubber goods	95,420	22,872	377,251	91,473
Other hard rubber goods	.....	31,777	.....	76,338
Tires				
Casings, automobile *number*	245,735	3,054,561	658,332	8,168,151
Tubes, automobile *number*	120,561	265,104	351,769	740,292
Other casings and tubes, *number*	3,028	10,217	8,733	27,209
Solid tires for automobiles and motor trucks *number*	11,178	357,810	32,659	981,582
Others	86,277	23,008	240,865	67,967
Tire accessories	.....	158,409	.....	358,390
Rubber and friction tape	162,266	46,283	426,121	109,162
Belting	325,179	188,747	1,158,429	629,370
Hose	542,935	204,057	1,677,173	647,012
Packing	172,466	81,208	583,090	268,637
Soles and heels	435,420	121,518	1,207,339	395,176
Thread	132,197	168,557	346,978	445,012
Rubber bands and erasers	70,698	49,646	185,095	140,678
Other rubber manufactures	.....	239,610	.....	611,757
Totals	.....	$5,946,540	.....	$16,393,453
Rubber toys and balls	.....	$18,855	.....	$49,919
Rubber balloons *gross*	73,793	$86,533	130,405	$164,459

Imports of Crude Rubber Into the United States by Customs Districts

	*April, 1927		Four Months Ended *April, 1927	
	Pounds	Value	Pounds	Value
Massachusetts	1,704,832	$638,990	17,415,131	$6,385,785
St. Lawrence	.....	.....	6,864	2,265
Buffalo	1,877	959	1,877	959
New York	96,642,976	34,840,779	310,671,780	113,823,071
Philadelphia	.....	.....	392,030	135,166
Maryland	336,010	116,509	3,238,560	1,157,687
New Orleans	.....	.....	2,057	227
Los Angeles	3,563,959	1,271,879	7,961,089	2,884,202
San Francisco	213,313	78,395	2,312,607	892,455
Oregon	168,000	63,706	470,386	183,463
Dakota	28	10	28	10
Michigan	910	325	910	325
Ohio	749,292	269,257	749,292	269,257
Colorado	112,000	40,696	380,800	143,625
Totals	103,493,197	$37,321,505	343,603,411	$125,878,497

*Including Latex Dry Rubber Content.

SOLID TIRE EXPORTS FROM THE UNITED STATES DURING MARCH were valued at $357,810, the tires numbering 11,178. The principal purchasers were the United Kingdom and Czechoslovakia.

Compounding Ingredients Market

THE time approaches when the high level production of tires and inner tubes may be expected to decrease. This and the lack of pressure for production in other lines of the rubber industry has resulted in a slight decline in demand for the principal compounding ingredients. Pig lead in May dropped to the lowest level since July, 1923, and brought about a reduction in the price of lead pigments. A reduction in the price of benzol also took effect about the middle of June, owing to excessive stock.

ACCELERATORS. The semi-ultra and super-accelerators are recognized as the important factors in compounding for low temperature curing, which makes possible larger and better use of reclaimed rubber without loss of tensile properties. The accelerator demand is thus well maintained.

ANTI-OXIDANTS. Rubber manufacturers in all lines are alert to the advantages of anti-oxidants as plasticisers, as well as age resisters. Their practical value having been established, the demand for them increases with only seasonal fluctuations.

BENZOL. Early in June a reduction of one cent a gallon was made on all grades. Trade was unsettled in tone and did not respond to the price reduction. The supplies are much in excess of the outlet.

CARBON BLACK. Good demand from the rubber industry still continues at unchanged prices. There is some interest in carbon black circles in a new process of manufacture, which it is claimed greatly increases the percentage yield of black from natural gas.

LITHARGE. The reduction of pig lead to the lowest price level since July, 1923, finally affected the prices of lead pigments. Litharge was reduced three-fourth cents a pound from nine cents the first of the month and consuming demand became more active.

LITHOPONE. Contracts are being booked for the last half of the year at prices unchanged from the first half. The demand is well maintained.

MINERAL RUBBER. This material in all grades is moving in heavy tonnage at unchanged prices.

SOLVENT NAPHTHA. Stocks continue to increase in volume. Domand is lagging somewhat and prices are steady.

STEARIC ACID. The use of this material as a stabilizer and activator of cure, is growing in popularity as rubber manufacturers realize its practical importance. The price holds steady.

ZINC OXIDE. The movement is fair and increasing in amount. Lead free grade declined one-eight cent a pound the end of May and has continued steady since then.

New York Quotations

June 25, 1927

Accelerators, Inorganic

Lead, carbonate	lb.	$0.09	@
Lead, red	lb.	.10	@
sublimed white	lb.	.08¼	@
sublimed blue	lb.	.08¼	@
super-sublimed white lead	lb.	.08¾	@
Lime, R. M. hydrated	ton	12.80	@
Litharge	lb.	.09	@
Magnesia cal., light	lb.	.15	@
calcined, extra light	lb.	.25	@
calcined, heavy	lb.	.04	@
magnesium, carb., light		.06	@ .06½
Orange mineral A.A.A.	lb.	.12	@

Accelerators, Organic

A-7	lb.	.70	@ .80
A-11	lb.	.75	@ .90
A-16	lb.	.65	@ .85
A-19	lb.	.75	@ .90
Aldehyde ammonia	lb.	.65	@ .70
Crylene, hard form	lb.		@
Paste	lb.		@
Di-ortho-tolylguanidine	lb.	.85	@ .93
Diphenyl guanidine	lb.	.68	@ .75
Ethylidine aniline	lb.	.60	@ .70
Formaldehyde aniline	lb.	.36	@ .42
P. A. C.	lb.	.09½	@ .10
Grasselerator 102	lb.	.65	@ .70
552	lb.	4.80	@ 5.00
808	lb.	1.05	@ 1.35
Heptene	lb.		@
Hexamethylene tetramine	lb.	.65	@ .70
Lithex	lb.		@
Methylene dianiline	lb.	.38	@ .40
Monex	lb.		@
No. 999 lead oleate	lb.	.16½	@
Phenyl orthotolyl guanidine	lb.	.76½	@ .81
Piperidine pentamethylene dithio carbamate	lb.	4.80	@ 5.00
R. & H. 40	lb.	.50	@ .55
50	lb.	.50	@ .55
Tensilac No. 39	lb.	.60	@ .65
No. 41	lb.	.60	@ .65
Thionex	lb.	3.25	@
Thiocarbanilid	lb.	.27½	@ .30
Trimene	lb.		@
base	lb.		@
Triphenylguanidine	lb.	.65	@ .70
Vulcanex	lb.	.86	@
Vulcanol	lb.	1.08	@
Vulcano	lb.	.74	@
Z-88	lb.	.75	@ 1.00

Acids

Acetic 28% (bbls.)	100 lbs.	3.37½	@
glacial (carboys)	100 lbs.	12.41	@
Oleic	lb.	.09½	@ .10
Stearic	lb.	.13½	@ .14
Sulphuric, 66%	100 lbs.	1.60	@

Alkalies

Caustic soda, solid	lb.	.03	@

Anti-Oxidants

Antox	lb.	$0.83	@
V. G. B.	lb.		@

Colors

BLACK

Bone	lb.	.05	@ .21
Carbon (see Comp. Ing.)			
A. & W. nonfi No. 1	lb.	.40	@
No. 2	lb.	.25	@
Drop	lb.	.06	@ .10
Lampblack (commercial)	lb.	.09	@

BLUE

A. & W. blue	lb.	1.25	@ 5.00
Du Pont, N	100 lbs.	1.35	@
Marine, A. C.	100 lbs.	1.30	@
5 R	100 lbs.	1.00	@
2 G	100 lbs.	.90	@
Prussian	lb.	.33	@ .35
Ultramarine	lb.	.08	@ .35

BROWN

Sienna, Italian	lb.	.04	@ .08

GREEN

A. & W. green	lb.	1.25	@ 3.00
Chrome, light	lb.	.27	@ .31
medium	lb.	.29	@ .32
dark	lb.	.31	@ .34
Du Pont, A. C.	100 lbs.	3.00	@
4 G	100 lbs.	.60	@
G. L.	100 lbs.	.30	@
Y. L.	100 lbs.	.75	@
Oxide of chromium	lb.	.38	@

ORANGE

Du Pont, 2 R	100 lbs.	1.40	@
R. X.	100 lbs.	1.30	@
Y. °O.	100 lbs.	1.60	@

RED

A. & W. red	lb.	.75	@ 3.50
purple	lb.	2.00	@ 4.00
Antimony, golden, No. 40	lb.	.22	@ .25
No. 60	lb.	.16	@ .20
golden 15/17%	lb.	.16	@ .20
T. K. "Special" 1%	lb.	.38	@
Fentasulphide 15/17%	lb.	.18	@
Antimony,			
Crimson, R.M.P. No. 3	lb.	.48	@
Sulphur free	lb.	.52	@
T. K. 15/17%	lb.	.40	@

Colors—*(Continued)*

7-A	lb.	$0.35	@
Z-2	lb.	.20	@
Vermilion, No. 5	lb.	.50	@ .55
No. 15	lb.	.37½	@ .42
Du Pont R. I.	100 lbs.	2.00	@
6 B.	100 lbs.	1.10	@
Brilliant A. C.	100 lbs.	1.05	@

Iron Oxides

bright pure domestic	lb.	.12	@
bright pure English	lb.	.14	@
bright reduced English	lb.	.10½	@
bright reduced domestic	lb.	.10	@
Indian (maroon), pure domestic	lb.	.11	@
Indian (maroon), pure English	lb.	.10½	@ .11
Indian (maroon), reduced English	lb.	.09½	@ .10
Indian (maroon), reduced domestic	lb.	.08	@
Oximony	lb.	.13¼	@
Spanish red oxide	lb.	.04	@
Venetian reds	lb.	.02	@ .06
Vermilion, English quick-silver	lb.	1.85	@ 1.95

WHITE

Lithopone	lb.	.05½	@
Azolith	lb.	.05¼	@ .05¾
Grasselli	lb.	.05¼	@ .05½
Sterling	lb.	.05¾	@ .06¼
Zinc Oxide			
AAA (lead free)	lb.		@
Azo (factory):			
ZZZ (lead free)	lb.	.06½	@ .07
ZZ (leaded)	lb.	.06¾	@ .07¼
Z (8% leaded)	lb.	.06¼	@ .07¼
French Process			
Green seal	lb.	.10¾	@
Red seal	lb.	.09¾	@
White seal	lb.	.11¾	@

YELLOW

A. & W. yellow	lb.	2.00	@ 4.00
T. K. sulphide	lb.	.65	@
Cadmium sulphide	lb.	1.50	@
Chrome	lb.	.16½	@ .18
Du Pont N.	100 lbs.	4.00	@
R. R.	100 lbs.	1.55	@
Grasselli cadmium	lb.	1.50	@
Ochre, domestic	lb.	.05½	@ .07
imported	lb.	.03	@ .03½
Oxide, pure	lb.	.10½	@
Zinc imported	lb.	.24	@

New York Quotations

June 25, 1927

Compounding Ingredients

Aluminum flake (sacks c.l.)	*ton*	$21.85	@
(sacks l.c.l.)	*ton*	24.50	@
Ammonium carbonate powd.	*lb.*	.11½	@
lump	*lb.*	.11	@
Asbestine	*ton*	13.40	@14.50
Barium, carbonate	*ton*	50.00	@55.00
dust	*lb.*	.05	@ .06
sulphate, dry	*lb.*	.03½	@ .04
Barytes, imported	*ton*	27.00	@36.00
water ground and floated	*ton*	34.00	@35.00
Basofor	*lb.*	.04½	@
Blanc fixe, dry	*ton*	85.00	@90.00
pulp	*ton*	60.00	@63.00
Carbon Black			
Aerfloted arrow	*lb.*	.09	@ .13
Compressed	*lb.*	.07½	@ .11½
Uncompressed	*lb.*	.07	@ .11
Micronex	*lb.*	.08	@ .12
Carrara filler	*lb.*	.01½	@
Chalk	*ton*	12.00	@
Clay china	*lb.*	.01¾	@
Mineral flour (Florida)	*ton*	20.00	@23.00
Perfection	*ton*	14.00	@
Suprex	*ton*	13.00	@26.00
Cotton flock, black	*lb.*	.10	@
light-colored	*lb.*	.10	@ .11
white	*lb.*	.11	@ .27
Fossil flour	*lb.*	.02¼	@
Glue, high grade	*lb.*	.22	@ .26
low grade	*lb.*	.18	@ .22
Infusorial earth	*lb.*	.02¼	@
Mica, amber (fact'y)	*ton*	80.00	@
Pumice stone, powd.	*lb.*	.02½	@ .04
Rotten stone (bbls.)	*lb.*	.02½	@ .04½
Soap bark	*lb.*	.13	@ .14
Soapstone	*ton*	15.00	@22.00
Stearex	*lb.*	.10	@ .14
Talc, domestic	*lb.*	.01¼	@
French	*ton*	18.00	@22.00
Velvetex	*lb.*	.04	@ .07

Compounding Ingredients—*(Continued)*

Whiting:			
Commercial	100 *lbs.*	$0.85	@$1.00
English, cliffstone	100 *lbs.*	1.50	@
Snow white	*ton*	12.00	@23.00
Westminster Brand	100 *lbs.*		@
Witco (c.l.). (fact'y)	*ton*	12.00	@
Whiting, imp. chalk.	100 *lbs.*	1.00	@ 1.15
Paris White, Eng. Cliff.	100 *lbs.*	1.60	@ 3.50

Factice

Black	*lb.*	.08	@ .14
Brown	*lb.*	.08	@ .16
White	*lb.*	.08	@ .17

Mineral Rubber

Genasco (facty.)	*ton*	50.00	@52.00
Gilsonite (fact'y)	*ton*	37.14	@39.65
Hydrocarbon, sort	*ton*	28.00	@34.00
Ohmlac Kapack, M. R.	*ton*	60.00	@
M-4	*ton*	175.00	@
Paradura (fact'y)	*ton*	62.50	@65.00
Pioneer, M. R., solid (fac.)	*ton*	41.00	@43.00
M. R. granulated	*ton*	51.00	@53.00
Robertson, M. R. solid (facty.)	*ton*	34.00	@80.00
M. R. gran. (facty.)	*ton*	34.00	@80.00

Oils (Softeners)

Castor, No. 1, U. S. P.	*lb.*	.13½	@
No. 3, U. S. P.	*lb.*	.13	@
Corn, crude (bbls.)	*lb.*	.11½	@
Cotton	*lb.*	.09	@ .10½
Cycline	*gal.*	.27	@ .34
Degras	*lb.*	.04¾	@ .05
Fluxrite fluid	*lb.*	.05	@ .06
solid	*lb.*	.05	@ .06
Glycerine	*lb.*	.26	@ .26½
Linseed, raw	*lb.*	.11	@ .12
Palm lagos (bbls.)	*lb.*	.10	@
niger (bbls.)	*lb.*	.09½	@
Peanut, crude	*lb.*	.10	@
refined	*lb.*	.14	@
Petrolatum, standard	*lb.*	.05¾	@
Pine, steam distilled	*gal.*	.72	@
Plastone	*lb*	.39	@
Rapeseed, refined	gal.	.80	@
Rosin	*gal.*	.55	@ .62
Tackol	lb.	.09	@ .15

Resins and Pitches

Pitch	*bbl.*	$9.50	@$10.50
Rosin, K (bbl.)	280 *lbs.*	10.75	@
Shellac, fine orange	*lb.*	.70	@
Tar, retort	*bbl.*	16.50	@17.00

Solvents

Benzol (90%, 7.21 lbs. gal.) pure	*gal.*	.29	@
Carbon bisulphide (10.81 lbs. gal.) 99.9% pure (drums)	*lb.*	.05½	@ .06½
tetrachloride (13.28 lbs. gal.) 99.7% pure (drums)	*lb.*	.07½	@ .08
Gasoline No. 303			
Tankcars	*gal.*	.18	@
Drums, c. l.	*gal.*	.23	@
Drums, l. c. l.	*gal.*	.25	@
Naphtha	*gal.*	.10¼	@ .14
Turpentine, spirits	*gal.*	.66½	@ .67½
wood, steam distilled	*gal.*	.64	@ .66

Vulcanizing Ingredients

Sulphur			
Velvet flour	100 *lbs.*	2.60	@ 3.50
Soft rubber (c.l.)	100 *lbs.*	2.60	@ 2.95
(l.c.l.)	100 *lbs.*	2.95	@ 3.30
Superfine commercial flour (c.l.)	*lb.*	2.20	@ 2.55
(l.c.l.)	*lb*	2.60	@ 3.10
Tire brand, superfine.	100 *lbs.*	2.20	@ 2.55
Tube brand, velvet.	100 *lbs.*	2.60	@ 2.95
(See also Colors—Antimony)			

Waxes

Beeswax, white, com.	*lb.*	.55	@
carnauba	*lb.*	.38	@ .50
ceresine white	*lb.*	.12	@
montan	*lb.*	.07	@ .07½
ozokerite, black	*lb.*	.27	@
green	*lb.*	.28	@
Paraffin			
122/124 white crude scale.	*lb.*	.03½	@
124/126 white crude scale.	*lb.*	.03¾	@
123/125 fully refined	*lb.*	.04½	@ .04¼
125/127 fully refined	*lb.*	.04¼	@ .04⅜

Carbon Black in 1926

The growth of the carbon black industry has been very rapid since 1915 when it gained importance as the most effective compounding ingredient for reinforcing the physical properties of crude rubber and rendering tire treads most resistant to abrasion. Its importance in this respect is now so great that half the annual production of carbon black is consumed in the rubber industry of the United States. Of the quarter that is exported probably the most is utilized in the rubber industry of the importing countries.

The production and sales of carbon black from natural gas are tabulated below for 1924-1926. The production minus the addition to stocks and the losses at the plants gives total deliveries or sales.

CARBON BLACK PRODUCTION AND SALES

	Production Pounds	Sales Pounds
1924	186,872,034	*180,000,000
1925	177,417,798	175,631,326
1926	180,576,176	167,504,710

*Estimated.

The distribution of carbon black among industries is reported by the United States Bureau of Mines as follows: Though the data for 1926 are not available, except for exports, it is probable that the poundages used in the ink, paint and miscellaneous trades were practically unchanged, the decline in total sales being chargeable to exports and to the largest consumer, the rubber industry.

CARBON BLACK DISTRIBUTION IN 1925

	Pounds	Per Cent
Rubber	86,329,000	49.2
Export	43,183,000	24.6
Ink	22,389,000	12.7
Paint	11,757,000	6.7
Miscellaneous	11,973,000	6.8
Totals	175,631,000	100.0

The estimated quantity of natural gas used in 1926 to produce 180,576,176 pounds of carbon black was 130,321,000,000 cubic feet. This indicates an average yield of 1.4 pounds of black per 1,000 cubic feet, or 0.1 pound over the 1925 yield and the highest recorded.

Louisiana produces 72 per cent of the total carbon black of the country. West Virginia, originally the leader in carbon black production, now produces but two per cent of the output. Texas shows the greatest gain in production of any of the states. Its output in 1926 was 36,328,052 pounds as compared with 26,219,510 pounds in 1925, a gain of 39 per cent. This more than compensated for the decline in West Virginia and Kentucky.

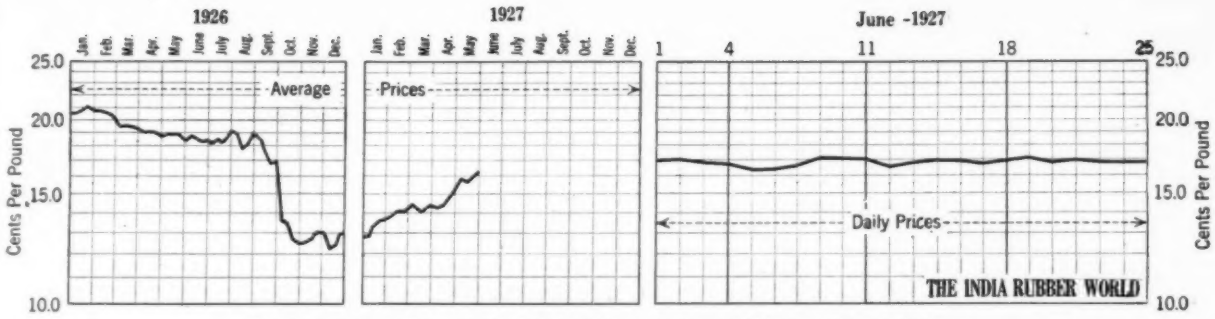
The channel process remains by far the most important method of manufacturing carbon black, producing 152,300,410 pounds in 1926 as compared with 28,275,766 pounds by the other processes, or 85 per cent of the whole.

Exports of carbon black in 1926 were 39,210,389 pounds, compared with 43,182,635 pounds in 1925. The average value of the 1926 exports was 9.2 cents a pound, compared with 8.2 cents in 1925. The United Kingdom is the largest export consumer followed in order by France, Canada and Germany, with France leading in her gain in consumption.

MECHANICAL RUBBER GOODS EXPORTS

April exports from the United States of mechanical rubber goods were the largest yet recorded in 1927, according to the Department of Commerce. The value of these shipments was $657,073, exceeding the 1926 average exports by more than $125,000.

Every item of the mechanical rubber goods class except rubber and friction tape established during April new volume and value records for 1927, unit values also showing slight advances, the single exception being rubber belting where there was a decline of $0.02 a pound from the first quarter average. The total value of mechanical rubber goods exports during the first three months of 1927 was $1,654,181.



Ratio Graph of New York Daily Prices of Spot Middling Upland Cotton

Market for Cotton and Fabrics

AMERICAN COTTON. The price for spot middling cotton during the first three weeks in June averaged 16.8 cents a pound. The high for the period was 17.05, the highest since September of last year. The low was 16.35 cents and the average showed 0.79 cents over the average for May. The improved and firmer prices were attributable to poor weather conditions. Early in June there was too much rain in the center belt and too little both East and West. The market was made sensitive by bullish figures on the world's consumption, planting delay in the flooded areas and the customary uncertain factors of the weather and boll weevil damage. The first government report on the area planted for the new crop is not due until July 6. It is thought that between a million and a million and a half acres cannot be planted in the Mississippi Valley this season. Some believe the crop cannot exceed 15,000,000 bales.

EGYPTIAN COTTON. All staples have held remarkably firm and fluctuations have been unimportant. In Egyptians the net gain has been about ½-cent a pound on both Sakel and Uppers. At present levels buying seems to have returned to a hand-to-mouth basis both here and abroad, consumers apparently having adopted a policy of watchful waiting. The Egyptian crop has thus far suffered no setback in any way and it is now generally agreed that the acreage reduction will be 10 to 15 per cent.

ARIZONA COTTON. The Pima crop is late, but in good condition and there is a tendency to increase estimates of the coming yield to about 35,000 bales.

SEA ISLAND COTTON. This season there is a renewed interest in growing Sea Islands and much talk of again growing it in the Southeast. Doubtless if 1½-inch and longer staples maintain their premiums, a serious effort will be made to grow Sea Islands. The lack of good seed, however, is an obstacle difficult to overcome. It probably would be better to plant Pimas or some other variety in the old Sea Island districts.

Cotton Fabrics

DUCKS, DRILLS AND OSNABURGS. The market in these goods is active and higher, based on the advances in spot cotton which commands a premium for white grades. Firmer prices are expected for fabrics for summer delivery.

RAINCOAT FABRICS. The raincoat business is very quiet at present as fall business has not started. This is considered due to the uncertainty of the trade on the precise lines to use. Most of the concerns are sampling and costing. Highly colored, light weight coats with attractive small plaid linings will be the popular line this year, as last.

SHEETINGS. The market is rather quiet but fairly strong, due to the sold-up conditions of the mills. Prices are strong.

TIRE FABRICS. The tire fabric mills are reported generally sold up to manufacturing capacity through to October 1 and can handle only a limited amount of orders between now and then. Certain of the mills can increase their night runs before reaching capacity output. Tire companies as a rule are said to cover by contract

New York Quotations

June 25, 1927

Drills

38-inch 2.00-yard	*yard*	$0.15¼@
40-inch 3.47-yard		.09⅛@
52-inch 1.90-yard		.16⅝@
52-inch 2.20-yard		.13¾@
59-inch 1.85-yard		.16 @
60-inch 1.52-yard		.20¼@

Ducks

38-inch 2.00-yard	*yard*	.16½@
40-inch 1.47-yard		.22½@
72-inch 16.66-ounce		.36½@
72-inch 17.21-ounce		.37⅛@
Single Filling		
38-inch 2.00-yard		.15⅝@
40-inch 1.45-yard		.19¾@
Double Filling		
72-inch 1.05		.31½
MECHANICAL		
Hose and belting	*pound*	.30½@
Specials		.35½@
TENNIS		
52-inch 1.35-yard	*yard*	.25 @

Hollands

RUBBER TRADE SPECIAL		
R. T. 3 A.		
31-inch	*yard*	.20 @
40-inch		.25 @
50-inch		.45 @
RED SEAL		
36-inch		.14½@
40-inch		.15 @
50-inch		.22½@
GOLD SEAL		
40-inch, No. 72		.19 @
40-inch, No. 80		.20½@

Osnaburgs

40-inch 2.35-yard	*yard*	$0.13¾@
40-inch 2.48-yard		.13⅛@
40-inch 3.00-yard		.10¾@
37-inch 2.42-yard		.13½@

Raincoat Fabrics

COTTON		
Bombazine 60 x 64	*yard*	.11 @
Bombazine 60 x 48		.10 @
Plaids 60 x 48		.11¼@
Plaids 48 x 48		.10½@
Surface prints 60 x 48		.12 @
Surface prints 64 x 60		.12¾@

Sheetings, 40-inch

48 x 48, 2.50-yard white	*yard*	.11½@
48 x 48, 2.50-yard, tinged		.11¼@
48 x 48, 2.85-yard white		.10¼@
48 x 48, 2.85 yard, tinged		.10 @
64 x 68, 3.15 yard		.11 @ .11¼
56 x 60, 3.60-yard		.09½@ .09¾
48 x 44, 3.75-yard		.08¾@ .08½

Sheetings, 36-inch

48 x 48, 5.00-yard	*yard*	.06¾@
44 x 40, 6.15-yard		.05¾@ .05¾

Tire Fabrics

SQUARE WOVEN 17¼-ounce		
Egyptian, karded	*pound*	$0.49 @$0.50
Peeler, karded		.40 @ .42
CORD 23/5/3		
Egyptian, combed	*pound*	.55 @ .56
Egyptian, karded		.49 @ .51
Peeler, karded, 1 1/16-in.		.42 @ .43½
CORD 23/4/3		
Peeler, karded	*pound*	.43½@ .45
CORD 23/3/3		
Peeler, karded	*pound*	.45 @
CORD 15/3/3		
Peeler, karded	*pound*	.41½@
CORD 13/3/3		
Peeler, karded	*pound*	.39 @ .41
LENO BREAKER		
8-oz. Peeler, karded	*pound*	.37 @ .40
10-oz. Peeler, karded		.37 @ .40
CHAFER		
8.25-oz. Peeler, karded (2 ply)	*pound*	@
9.5-oz. Peeler, karded (4-ply)		.50 @
12-oz. Peeler, karded		.48 @
14-oz. Peeler, karded		.48 @

about three quarters of their fabric capacity needs and fill in their ultimate requirements in subsequent orders. This provides for changes due to tire sales deviating from the estimated schedule.

Tire fabric and yarn constructions are now subject to fewer changes than formerly, because of greater uniformity in tire building practice. Some tire manufacturers consider it advisable to use slightly cheaper grades of cotton while others maintain that the best long staple is essential in their highest class tires.

During the first half year the rubber industry has consumed about 15 to 20 per cent more tire fabric than in the corresponding period of last year. This is due to the increase in tire production and to the use of six in place of four plies in all but the small sizes and cheaper grades of tires.

The Cotton Outlook

Estimates of Flood Damages

The first complete estimate regarding the damages caused by the Mississippi flood has been prepared by the Crop Reporting Board, Department of Agriculture. According to this survey, a total of 2,165,000 acres of cotton land, the 1926 production of which was 1,028,000 bales, was inundated in the states of Mississippi, Arkansas, Louisiana, Missouri and Tennessee, Arkansas being the greatest sufferer. The department's figures also show that more than 3,518,000 acres of land were covered by flood water, slightly more than one-half of which was in Arkansas.

Authorities differ in regard to the probable losses sustained by the 1927 staple cotton crop, one authority estimating this crop at 40 per cent of normal, while others believe that the cut will range around 25 per cent. The president of one Southern cotton handling organization says:

The upper Arkansas Delta produces some 1⅛-inch cotton but no volume that is any longer. From Memphis south in both the Arkansas and Mississippi Deltas the bulk of the cotton above 1⅛-inch is produced. The Louisiana Delta also produces considerable long cotton. Throughout the deltas mentioned there is land known as the second level which is a few feet higher than the land lying closer to the Mississippi river. This second level, while fertile and good land, does not produce the heavy bodied longer staples common to the land nearer the river (the lower lands). The most fertile areas which produce the best cotton are the lowest lands.

Taking into consideration the impossibility of planting due to scattered labor, inability to get financed, and water staying over the land too late and the change to shorter varieties, it probably would not be amiss to hazard the statement that the production of cotton in the whole Mississippi river delta, on both sides, of cotton longer than 1⅛-inch will be curtailed about 25 per cent, leaving out of consideration heavy weevil damage due to a late start.

Another company, familiar with conditions in the cotton industry, claims that the first effect of the news of the disaster's extent was to bring into the European markets buyers for the long staple Egyptian cotton, with rise in prices, while Dr. Lewis H. Haney, director of the Business Research Bureau, New York University, makes some interesting statements regarding the damages, after saying, however, that the effect of the flood in the cotton sections has been exaggerated. Dr. Haney's views are given in part as follows:

The new crop is likely to be considerably less than last year. The flood damage is now estimated to mean a reduction in the crop of about 500,000 bales. The consensus of opinion continues to be that the acreage will be at least 10 per cent smaller. While the condition of the crop at present appears to be about the same as a year ago, it is felt that there is considerable prospect of a reduction in the final yield due to a heavy weevil emergence, a smaller use of fertilizer in most sections, and the lateness of the crop in considerable areas. Probably, however, the most serious factor of this kind at present lies in the long continued drought in West Texas. Favorable progress has been made on the new crop outside of the flooded areas. Weather conditions have on the whole been quite favorable. While rains are needed in parts of Texas, the outlook in most of the southeast and Alabama is good.

Opinions Regarding Acreage Cuts

While some authorities claim that because of unprecedented conditions no accurate account can be given as to the losses of the cotton industry in the recent flood, or the probabilities of the future crop, the Fairchild estimate indicates that 43,375,000 acres have been planted, or are to be planted to cotton, or 11 per cent less than the revised acreage planted last year of 48,730,000 acres. The J. W. Jay & Co. cotton report claims a prospective acreage planted to cotton of 44,211,000 acres, or a decrease of 9.3 per cent.

American Cotton Consumption and Exports

Cotton consumed in the United States during May totaled, according to the Census Bureau, 633,024 bales, as compared with 516,376 bales for the corresponding month of 1926. During the ten months ended May 31 the consumption by domestic mills was placed at 5,970,844 bales, as against 5,475,502 bales for the same period last year. Exports for the ten months have been 10,312,637 bales, against 7,442,315 bales a year ago. It has been said that cotton consumption in the Asiatic markets is bound to show a steady gain, while American cotton may replace during this season, as it did to such a remarkable extent last season, the East Indian and other growths in Japan, Germany, and India itself.

Cotton Planting Experiments

Experiments are being made in the raising of Acala long staple cotton, both Georgia and California participating on a considerable scale. Developments in the last-mentioned state from small beginnings commenced in 1920 are reviewed in a bulletin now being issued by the Department of Agriculture and entitled "Community Production of Acala Cotton in the Coachella Valley of California." The Acala variety is said to be an early, productive, medium staple Upland cotton, producing high average yields while it is also unusually resistant to adverse conditions. Developed in Texas from a native stock, it was discovered in Southern Mexico by the department in 1906.

UNITED STATES EXPORTS OF RUBBER BOOTS AND SHOES DURING THE first quarter of 1927 have totaled, according to the Department of Commerce, 1,579,000 pairs, as against 1,576,000 pairs for the corresponding quarter of 1926.

The following dealers in cotton goods for the rubber industry are listed in our Buyers' Directory. For complete information see Index to Advertisers on Page 100.

Adams, H. J. Co., The, Akron, Ohio.
Bibb Manufacturing Co., Macon, Georgia.
Brighton Mills, Passaic, New Jersey.
Callaway Mills, Inc., New York, N. Y.
Cannon Mills, Inc., New York, N. Y.
Curran & Barry, New York, N. Y.
Lane, J. H. & Co., New York, N. Y., and Chicago, Illinois.
Lawrence & Co., New York, N. Y.
Willingham Cotton Mills, Macon, Georgia.

United Kingdom Rubber Statistics

Imports

UNMANUFACTURED	April, 1927		Four months Ended April, 1927	
Crude Rubber				
From—	Pounds	Value	Pounds	Value
Straits Settlements	14,948,200	£1,241,117	51,154,000	£4,194,607
Federated Malay States	7,578,300	609,348	23,649,600	1,926,433
British India	1,331,700	110,070	5,648,500	462,771
Ceylon and Dependencies	3,950,000	326,109	15,811,400	1,274,765
Other Dutch possessions in Indian Seas	3,041,800	249,084	9,530,100	786,308
Dutch East Indies (except other Dutch possessions in Indian Seas)	2,858,300	241,003	10,916,200	904,458
Other countries in East Indies and Pacific not elsewhere specified	129,100	10,698	707,000	57,066
Brazil	1,241,500	75,474	5,178,900	325,414
Peru	.....	.....	2,700	204
South and Central America (except Brazil and Peru)	68,800	5,136	122,200	9,013
West Africa:				
French West Africa	1,500	70	64,200	3,449
Gold Coast	37,600	3,064	229,700	16,635
Other parts of West Africa	121,400	9,563	610,600	48,856
East Africa, including Madagascar	169,300	12,242	568,300	43,356
Other countries	99,400	8,142	545,300	40,961
Totals	35,576,900	£2,901,120	124,739,200	£10,094,296
Waste and reclaimed rubber	618,300	10,882	2,191,700	38,486
Gutta percha and balata	222,600	19,500	2,250,900	197,904
Rubber substitutes	20,400	1,022	74,000	3,109
Totals	861,300	£31,404	4,516,600	£239,499
MANUFACTURED				
*†‡Tires and tubes				
Pneumatic				
Outer covers	.....	£537,436	.....	£1,669,847
Inner tubes	.....	50,241	.....	201,785
Solid tires	.....	18,706	.....	97,726
Boots and shoes...*doz. pairs*	48,152	81,984	159,706	256,616
Other rubber manufactures	.....	160,502	.....	586,071
Totals	48,152	£848,869	159,706	£2,812,045

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	1,651,200	£18,955	8,830,900	£90,661
Rubber substitutes	12,100	215	221,300	5,134
Totals	1,663,300	£19,170	9,052,200	£95,795
MANUFACTURED				
*‡Tires and Tubes				
Pneumatic				
Outer covers	.....	£258,864	.....	£1,140,617
Inner tubes	.....	60,049	.....	246,683
Solid tires	.....	26,185	.....	129,307
Boots and shoes...*doz. pairs*	20,908	28,634	70,946	108,076
Other rubber manufactures	.....	238,359	.....	930,991
Totals	20,908	£612,091	70,946	£2,555,674

Exports—Colonial and Foreign

UNMANUFACTURED	April, 1927		Four Months Ended April, 1927	
Crude Rubber				
To—	Pounds	Value	Pounds	Value
Russia	4,417,300	£378,718	10,005,400	£986,227
Sweden, Norway and Denmark	133,800	12,568	700,300	66,704
Germany	1,939,700	155,717	7,952,600	638,303
Belgium	558,300	44,383	1,489,200	113,607
France	1,344,800	111,585	6,419,000	519,995
Spain	39,900	3,722	428,800	33,330
Italy	1,091,700	102,014	3,592,700	317,144
Other European countries	356,300	31,439	1,132,300	99,649
United States	7,937,900	633,105	14,752,900	1,166,808
Canada	22,100	1,900	31,500	2,910
Other countries	95,500	8,179	265,500	24,525
Totals	17,937,300	£1,483,330	46,770,200	£3,969,202
Waste and reclaimed rubber	16,800	£481	98,500	£2,298
Gutta percha and balata	18,000	1,770	142,900	15,627
Rubber substitutes	.....	.....	6,500	240
Totals	34,800	£2,251	247,900	£18,165
MANUFACTURED				
*‡Tires and tubes				
Pneumatic				
Outer covers	.....	£44,528	.....	£256,315
Inner tubes	.....	6,850	.....	35,871
Solid tires	.....	773	.....	4,366
Boots and shoes...*doz. pairs*	2,817	6,587	5,826	13,733
Other rubber manufactures	.....	8,401	.....	33,397
Totals	2,817	£67,139	5,826	£343,682

* On and after April 12, 1927, rubber tires and tubes imported or exported with and forming part of the equipment of complete vehicles or of chassis, or fitted to wheels imported separately, are included under complete vehicles or parts, respectively.

† Motor cars, motorcycles, and parts and accessories thereof, liable to duty from September 29, 1915, until August 1, 1924, inclusive, and on and after July 1, 1925. Commercial vehicles, etc., and parts and accessories thereof were, however, exempt from duty until April 30, 1926, inclusive, and rubber tires and tubes for motor cars and motorcycles until April 11, 1927, inclusive.

‡ Included all tires and tubes prior to April 12, 1927.

Dominion of Canada Rubber Statistics

Imports of Crude and Manufactured Rubber

UNMANUFACTURED	March, 1927		Twelve Months Ended March, 1927	
	Pounds	Value	Pounds	Value
Rubber, gutta percha, etc.				
From United Kingdom	27,842	$11,040	137,944	$52,775
United States	7,753,908	3,223,050	45,441,294	20,355,514
Straits Settlements	466,766	188,593	4,005,185	1,629,318
Dutch East Indies	104,488	40,759	533,081	233,354
France	67,768	20,938	93,670	25,652
Other countries	2,240	1,133	13,440	16,733
Totals	8,423,012	$3,485,513	50,224,614	$22,313,346
Rubber recovered	1,151,433	$152,364	8,692,535	$1,061,909
Rubber, powdered and rubber or gutta percha scrap	855,457	65,939	7,737,061	482,023
Balata	.....	.....	6,588	4,237
Rubber substitutes	135,483	14,482	941,740	115,127
Totals	10,565,385	$3,718,298	67,602,538	$23,976,642
PARTLY MANUFACTURED				
Hard rubber sheets and rods	17,357	$8,305	114,185	$63,087
Hard rubber tubes	.....	1,753	.....	11,623
Rubber thread not covered	18,967	25,534	151,230	226,235
Totals	36,324	$35,592	265,415	$300,945
MANUFACTURED				
Belting	.....	$14,623	.....	$205,611
Hose	.....	17,222	.....	176,402
Packing	.....	6,995	.....	50,131
Boots and shoes...*pairs*	1,783	5,676	63,950	116,264
Clothing, including waterproofed	.....	75,443	.....	287,073
Gloves	.....	2,051	.....	20,205
Hot water bottles	.....	1,665	.....	20,613
Tires, solid...*number*	61	2,813	662	37,069
Tires, pneumatic...*number*	7,235	34,076	45,089	299,899
Tires, tubes...*number*	4,887	7,435	23,393	52,295
Elastic, round and flat	.....	24,564	.....	193,631
Mats and matting	.....	4,245	.....	44,210
Cement	.....	10,219	.....	93,936
Golf balls...*dozen*	7,008	29,043	44,498	180,601
Heels, rubber...*pairs*	79,016	4,196	346,218	19,872
Other rubber manufactures	.....	157,298	.....	1,302,548
Totals	.....	$397,564	.....	$3,100,360
Totals, rubber imports	.....	$4,151,454	.....	$27,377,947

Exports of Domestic and Foreign Rubber Goods

UNMANUFACTURED	March, 1927		Twelve Months Ended March, 1927	
	Produce of Canada Value	Re-exports of Foreign Goods Value	Produce of Canada Value	Re-exports of Foreign Goods Value
Crude and waste rubber	$23,385	.....	$296,787	.....
Totals	$23,385	.....	$296,787	.....
MANUFACTURED				
Belting	$44,880	.....	$547,031	.....
Canvas shoes with rubber soles	424,663	.....	3,876,441	.....
Boots and shoes	56,803	.....	2,498,180	.....
Clothing including waterproofed	3,903	.....	25,479	.....
Hose	20,198	.....	279,489	.....
Tires, casings	1,867,797	.....	15,552,251	.....
Inner tubes	347,281	.....	2,671,871	.....
Solid	57,466	.....	341,787	.....
Other rubber manufactures	52,608	$5,933	606,187	$105,719
Totals	$2,875,599	$5,933	$26,398,716	$105,719
Totals, rubber exports	$2,898,984	$5,933	$26,695,503	$105,719

CARBON BLACK SUBSTITUTE

A carbon produced by gaseous reaction in the presence of a finely divided metal catalyst, together with the catalyst on which it is deposited, has been tested as a substitute for carbon gas black. The mixture of carbon and catalyst contains from 5 to 10 per cent of catalyst. The latter preferably consists of about equal parts of finely divided nickel and iron reduced from nickel monoxide and iron sesquioxide by carbon monoxide at about 500 degrees C.

The carbon produced containing a small amount of catalyst is reported to have the following advantages over gas black from natural gas; (1) it possesses slightly greater toughening qualities; (2) it reduces the dead effect incidental to the use of gas black; (3) its apparent gravity is greater than gas black; (4) it mixes in rubber more easily; (5) the mix produced is quicker curing.

Definitely better mechanical properties are said to have been obtained from comparison of the carbon-catalyst black and natural gas black cured to the same degree in the following test mixing: Parts by weight, rubber 200, black 72, zinc oxide 20, sulphur 8, diphenyl-guanidine 2.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

	Cases
May 14. By "Nieuw Amsterdam," Far East.	
H. Muehlstein & Co., Inc.	200
May 15. By "Clontarf," Europe.	
General Rubber Co.	100
May 15. By "Napierian," London.	
Baird Rubber & Trading Co., Inc.	†115
Hood Rubber Co.	†290
May 16. By "Celtic," Europe.	
Littlejohn & Co., Inc.	74
Raw Products Co.	210
May 16. By "Lancastria," Europe.	
H. A. Astlett & Co.	61
General Rubber Co.	405
Littlejohn & Co., Inc.	1,184
The Meyer & Brown Corp.....pkgs.	77
Charles T. Wilson Co., Inc.	1,196
May 16. By "London Mariner," London.	
Baird Rubber & Trading Co., Inc.	228
Littlejohn & Co., Inc.	176
May 16. By "Minnetonka," Europe.	
General Rubber Co.	50
Littlejohn & Co., Inc.	394
May 16. By "Venice Maru," Far East.	
H. A. Astlett & Co.	897
Baird Rubber & Trading Co., Inc.	1,025
General Rubber Co.	4,128
Haldane Bierrie & Co., Inc.	191
Littlejohn & Co., Inc.	2,007
The Meyer & Brown Corp.....pkgs.	698
H. Muehlstein & Co., Inc.	867
Poel & Kelly, Inc.	870
Raw Products Co.	375
Charles T. Wilson Co., Inc.	1,035
May 17. By "Naples Maru," Far East.	
The Meyer & Brown Corp.....pkgs.	48
H. Muehlstein & Co,. Inc.	255
May 18. By "City of Bath," Far East.	
H A. Astlett & Co.	2,573
Baird Rubber & Trading Co., Inc.	750
General Rubber Co.	7,935
Haldane Bierrie & Co., Inc.	350
Adolph Hirsch & Co., Inc.	51
Littlejohn & Co., Inc.	3,248
Meyer & Brown, Inc.....pkgs.	207
The Meyer & Brown Corp.....pkgs.	2,068
H. Muehlstein & Co., Inc.	1,133
Poel & Kelly, Inc.	463
Poel & Kelly, Inc.	†100
Raw Products Co.	231
Rogers Brown & Crocker Bros., Inc.	205
Charles T. Wilson Co,. Inc.	989
May 18. By "Pres. Hayes," Far East.	
H. A. Astlett & Co.	950
Baird Rubber & Trading Co., Inc.	1,932
General Rubber Co.	3,208
Haldane Bierrie & Co., Inc.	50
Littlejohn & Co., Inc.	3,528
Meyer & Brown, Inc.....pkgs.	50
The Meyer & Brown Corp.....pkgs.	602
H. Muehlstein & Co., Inc.	641
Poel & Kelly, Inc.	890
Raw Products Co.	220
Rogers Brown & Crocker Bros., Inc.	†112
Rogers Brown & Crocker Bros., Inc.	849
Charles T. Wilson Co., Inc.	280
May 19. By "Inverbank," Singapore.	
Baird Rubber & Trading Co., Inc.	660
Littlejohn & Co., Inc.	574
H. Muehlstein & Co., Inc.	240
Poel & Kelly, Inc.	250
May 19. By "Manaar," Far East.	
H. A. Astlett & Co.	250
General Rubber Co.	2,906
Littlejohn & Co., Inc.	424
H. Muehlstein & Co., Inc.	280
Charles T. Wilson Co., Inc.	318
May 21. By "Halizones," Far East.	
General Rubber Co.	21
Littlejohn & Co., Inc.	546
Meyer & Brown, Inc.....pkgs.	105
May 21. By "Saugus," Europe.	
Littlejohn & Co., Inc.	100
May 22. By "Carmania," Europe.	
General Rubber Co.	4,995
Littlejohn & Co., Inc.	500
The Meyer & Brown Corp.....pkgs.	13
Charles T. Wilson Co., Inc.	223
May 23. By "American Banker," London.	
Baird Rubber & Trading Co., Inc.	73
H. Muehlstein & Co., Inc.	71
May 23. By "Burgerdyk," Europe.	
General Rubber Co.	110
Littlejohn & Co., Inc.	206
The Meyer & Brown Corp.....pkgs.	150
H. Muehlstein & Co., Inc.	100
May 23. By "Minnekahda," Europe.	
General Rubber Co.	1,704
May 25. By "Atreus," Far East.	
H. A. Astlett & Co.	1,39
Baird Rubber & Trading Co., Inc.	2,003
General Rubber Co.	7,341
Haldane Bierrie & Co., Inc.	1,050
Adolph Hirsch & Co., Inc.	40
Hood Rubber Co.	†304
Littlejohn & Co., Inc.	3,450
Meyer & Brown, Inc.....pkgs.	183
The Meyer & Brown Corp.....pkgs.	1,357
H. Muehlstein & Co., Inc.	355
Poel & Kelly, Inc.	1,06
Rogers Brown & Crocker Bros., Inc.	988
Charles T. Wilson Co., Inc.	1,049
May 26. By "City of Carlisle," Far East.	
Baird Rubber & Trading Co., Inc.	112
General Rubber Co.	36
Haldane Bierrie & Co., Inc.	150
Littlejohn & Co., Inc.	456
The Meyer & Brown Corp.....pkgs.	35
H. Muehlstein & Co., Inc.	75
May 26. By "Soekaboemi," Far East.	
H. A. Astlett & Co.	1,362
Baird Rubber & Trading Co., Inc.	519
General Rubber Co.	5,127
Haldane Bierrie & Co., Inc.	515
Hood Rubber Co.	†383
Littlejohn & Co., Inc.	1,902
Meyer & Brown, Inc.....pkgs.	55
The Meyer & Brown Corp.....pkgs.	519
H. Muehlstein & Co., Inc.	437
Poel & Kelly, Inc.	683
Raw Products Co.	50
Rogers Brown & Crocker Bros., Inc.	77
Charles T. Wilson Co., Inc.	1,180
May 27. By "Mississippi," London.	
Hood Rubber Co.	†408
May 27. By "Rotterdam," Europe.	
H. A. Astlett & Co.	368
General Rubber Co.	421
Haldane Bierrie & Co., Inc.	107
Littlejohn & Co., Inc.	674
May 29. By "London Exchange," Europe.	
Littlejohn & Co., Inc.	500
May 30. By "American Trader." Europe.	
General Rubber Co.	2,005
May 30. By "Minnewaska," London.	
Baird Rubber & Trading Co., Inc.	200
General Rubber Co.	7,431
Haldane Bierrie & Co., Inc.	246
Littlejohn & Co., Inc.	437
H. Muehlstein & Co., Inc.	148
Charles T. Wilson Co., Inc.	111
May 30. By "Tyne Maru," Far East.	
H. A. Astlett & Co.	436
Baird Rubber & Trading Co., Inc.	540
General Rubber Co.	1,696
Littlejohn & Co., Inc.	1,229
The Meyer & Brown Corp.....pkgs.	65
H. Muehlstein & Co., Inc.	329
Poel & Kelly, Inc.	230
Raw Products Co.	465
Rogers Brown & Crocker Bros., Inc.	386
Charles T. Wilson Co., Inc.	478
May 31. By "Binnendyk," Europe.	
Littlejohn & Co., Inc.	200
June 1. By "Cedric," London.	
Haldane Bierrie & Co., Inc.	181
June 2. By "Pres. Grant," Far East.	
Poel & Kelly, Inc.	*250
June 2. By "Pres. Polk," Far East.	
H. A. Astlett & Co.	1,095
Baird Rubber & Trading Co., Inc.	850
General Rubber Co.	2,259
Haldane Bierrie & Co., Inc.	650
Littlejohn & Co., Inc.	1,288
The Meyer & Brown Corp.....pkgs.	556
H. Muehlstein & Co., Inc.	500
Poel & Kelly, Inc.	420
Rogers Brown & Crocker Bros., Inc.	603
Charles T. Wilson Co., Inc.	572
June 3. By "Meltonian," London.	
Hood Rubber Co.	†33
June 4. By "Volendam," Far East.	
General Rubber Co.	113
Littlejohn & Co,. Inc.	161
H. Muehlstein & Co., Inc.	140
June 5. By "Bolton Castle," Far East.	
H. A. Astlett & Co.	650
Baird Rubber & Trading Co., Inc.	1,000
General Rubber Co.	5,270
Haldane Bierrie & Co., Inc.	224
Hood Rubber Co.	101
Littlejohn & Co., Inc.	4,055
The Meyer & Brown Corp.....pkgs.	1,752
H. Muehlstein & Co., Inc.	1,039
Poel & Kelly, Inc.	221
Roger Brown & Crocker Bros., Inc.	94
Charles T. Wilson Co., Inc.	1,822
June 5. By "Laconia," London.	
Hood Rubber Co.	†5
Charles T. Wilson Co., Inc.	18
June 6. By "Adriatic," London.	
Baird Rubber & Trading Co., Inc.	54
June 6. By "Malakand," Far East.	
General Rubber Co.	1,654
June 6. By "Minnesota," London.	
Baird Rubber & Trading Co., Inc.	248
General Rubber Co.	3,626
Littlejohn & Co., Inc.	2,972
The Meyer & Brown, Inc.....pkgs.	110
June 6. By "Tuscania," Europe.	
General Rubber Co.	773
Charles T. Wilson Co., Inc.	730
June 8. By "Javanese Prince," Far East.	
H. A. Astlett & Co.	593
Baird Rubber & Trading Co., Inc.	900
General Rubber Co.	5,291
Haldane Bierrie & Co., Inc.	498
Hood Rubber Co.	†300
Littlejohn & Co., Inc.	2,252
Meyer & Brown, Inc.....pkgs.	50
The Meyer & Brown Corp.....pkgs.	400
H. Muehlstein & Co., Inc.	836
Poel & Kelly, Inc.	191
Roger Brown & Crocker Bros., Inc.	409
Charles T. Wilson Co., Inc.	1,239
June 8. By "Katuna," Europe.	
General Rubber Co.	100
Haldane Bierrie & Co., Inc.	400
Littlejohn & Co., Inc.	150
The Meyer & Brown Corp.....pkgs.	78
June 8. By "Pres. Cleveland," Far East.	
H. A. Astlett & Co.	*337
June 9. By "Anniston City," Far East.	
H. A. Astlett & Co.	890
Baird Rubber & Trading Co., Inc.	1,450
Paul Bertuch & Co., Inc.	75
General Rubber Co.	7,772
Haldane Bierrie & Co., Inc.	95
Littlejohn & Co., Inc.	1,669
The Meyer & Brown Corp.....pkgs.	795
H. Muehlstein & Co., Inc.	300
Poel & Kelly, Inc.	95
Raw Products Co.	186
Rogers Brown & Crocker Bros., Inc.	1,161
Charles T. Wilson Co., Inc.	1,260
June 9. By "City of St. Joseph," Europe.	
General Rubber Co.	150
June 10. By "Silverbeech," Far East.	
Poel & Kelly, Inc.	*100
June 11. By "Veendam," Europe.	
Littlejohn & Co., Inc.	42
June 12. By "Balsam," London.	
Baird Rubber & Trading Co., Inc.	†106
June 12. By "Devonian," London.	
Hood Rubber Co.	†111
June 13. By "American Farmer," Europe.	
The Meyer & Brown Corp.....pkgs.	463
June 13. By "Cuba Maru," Far East.	
H. A. Astlett & Co.	1,360
Baird Rubber & Trading Co., Inc.	780
General Rubber Co.	1,656
Haldane Bierrie & Co., Inc.	70
Littlejohn & Co., Inc.	1,816
Meyer & Brown, Inc.	50
The Meyer & Brown Corp.....pkgs.	1,650
H. Muehlstein & Co., Inc.	300
Poel & Kelly, Inc.	410
Raw Products Co.	180
Rogers Brown & Crocker Bros., Inc.	733
June 13. By "Lorenzo," Far East.	
H. A. Astlett & Co.	1,211
Baird Rubber & Trading Co., Inc.	1,213
General Rubber Co.	3,438
Haldane Bierrie & Co., Inc.	145
Hood Rubber Co.	†468
Littlejohn & Co., Inc.	2,117
The Meyer & Brown Corp.....pkgs.	965
Poel & Kelly, Inc.	80
Raw Products Co.	415
Rogers Brown & Crocker Bros., Inc.	594
Charles T. Wilson Co., Inc.	910
June 13. By "Manoeran," Far East.	
H. A. Astlett & Co.	455
Baird Rubber & Trading Co., Inc.	544
General Rubber Co.	1,465
Haldane Bierrie & Co., Inc.	300
Hood Rubber Co.	401
Littlejohn & Co., Inc.	541
The Meyer & Brown Corp.....pkgs.	304
H. Muehlstein & Co., Inc.	426
Poel & Kelly, Inc.	90
Raw Products Co.	153
Charles T. Wilson Co., Inc.	90
June 13. By "Minnetonka," Europe.	
General Rubber Co.	425
Littlejohn & Co., Inc.	2,216
H. Muehlstein & Co., Inc.	293
Charles T. Wilson Co., Inc.	110

	Cases
June 13. By "Pres. Adams," Far East.	
Hood Rubber Co.	†250
June 13. By "Scythia," Europe.	
H. A. Astlett & Co.	41
The Meyer & Brown Corp. ....pkgs.	32
June 13. By "Teucer," Far East.	
H. A. Astlett & Co.	874
Baird Rubber & Trading Co., Inc.	1,245
General Rubber Co.	2,922
Haldane Bierrie & Co., Inc.	1,658
Littlejohn & Co., Inc.	1,262
The Meyer & Brown Corp. ....pkgs.	546
H. Muehlstein & Co., Inc.	50
Charles T. Wilson Co., Inc.	560
June 15. By "Larchbank," Far East.	
Rogers Brown & Crocker Bros., Inc.	550
June 15. By "Maine," London.	
Hood Rubber Co.	†974
H. Muehlstein & Co., Inc.	157
June 19. By "Pres. McKinley," Far East.	
H. A. Astlett & Co.	*250

Rubber Latex

	Gallons
June 14. By "Pres. Adams," Far East.	
Rogers Brown & Crocker Bros., Inc.	†156

*Arrived at Los Angeles.
†Arrived at Boston.
‡Arrived at Texas.

Africans

	Cases
May 15. By "Caronia," Europe.	
Littlejohn & Co., Inc. ....casks	58
May 16. By "Naples Maru," Europe.	
Littlejohn & Co., Inc.	584
May 18. By "Eastern Dawn," Europe.	
Hood Rubber Co. ....bags	†1,604
May 18. By "Nitonian," Europe.	
Littlejohn & Co., Inc. ....casks	34
May 24. By "Rouissillon," Europe.	
Littlejohn & Co., Inc.	252
May 27. By "Rotterdam," Europe.	
Littlejohn & Co., Inc.	77
May 27. By "West Nohno," Africa.	
Littlejohn & Co., Inc.	40
May 28. By "Texas Maru," Hamburg.	
Poel & Kelly, Inc. ....bales	56
June 4. By "Volendam," Europe.	
Littlejohn & Co., Inc.	194
June 8. By "Harcuvar," Europe.	
Littlejohn & Co., Inc.	152
June 8. By "La Bourdonnaise," France.	
Baird Rubber & Trading Co., Inc. ..casks	8
June 12. By "Sarcoxie," Europe.	
Littlejohn & Co., Inc.	399
June 12. By "Scythia," Europe.	
Littlejohn & Co., Inc. ....casks	120
June 13. By "Celtic," Europe.	
Littlejohn & Co., Inc.	36

Balata

June 7. By "Oranje Nassau," Far East.	
Middleton & Co., Ltd. ....bales	14

Guayule

May 14. By "Monterey," Mexico.	
Continental Rubber Co. of New York.	1,680
May 21. By "Camaguey," Mexico.	
Continental Rubber Co. of New York.	560
May 27. By "Railways," Mexico.	
Continental Rubber Co. of New York.	‡500
May 30. By "Mexico," Mexico.	
Continental Rubber Co. of New York.	560
June 1. By "Railways," Mexico.	
Continental Rubber Co. of New York.	‡1,060
June 5. By "Panuco," Mexico.	
Continental Rubber Co. of New York.	1,120
June 7. By "Railways," Mexico.	
Continental Rubber Co. of New York.	‡560
June 14. By "Agwidale," Mexico.	
Continental Rubber Co. of New York.	560
June 14. By "Railways," Mexico.	
Continental Rubber Co. of New York.	‡1,060

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
May 16. By "Swinburne," Brazil.					
H. A. Astlett & Co.	130	...	19	...	...
Paul Bertuch & Co., Inc.	376	...	240	146	...
General Rubber Co.	269	14	317	394	**2
Littlejohn & Co., Inc.	315	...	285	489	...
The Meyer & Brown Corp. ..pkgs.	971	...	...	98	...
May 19. By "Ardenhall," Brazil.					
H. A. Astlett & Co.	249	2	54	...	...
Paul Bertuch & Co., Inc.	270	...	300	240	...
General Rubber Co.	155	17	43	1	...
Littlejohn & Co., Inc.	...	...	100	...	...
May 31. By "Hubert," Brazil.					
H. A. Astlett & Co.	...	...	...	50	...
Paul Bertuch & Co., Inc.	136	...	...	65	...
General Rubber Co.	435	13	406	228	**8
Littlejohn & Co., Inc.	886	16	354	567	...
The Meyer & Brown Corp. ..pkgs.	...	...	...	...	††73
June 10. By "Cuthbert," Brazil.					
Paul Bertuch & Co., Inc.	202	...	136	489	...
General Rubber Co.	535	21	154	125	**8
Littlejohn & Co., Inc.	158	...	316	1,230	...
The Meyer & Brown Corp. ..pkgs.	200	...	...	153	...

** Mixed.
†† Washed and dried.

United States Crude and Waste Rubber Imports for 1927 by Months

	Plantations	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1927	Total 1926	Balata	Miscellaneous	Waste
January ....tons	42,646	2,378	269	299	144	...	45,736	38,697	106	1,508	447
February	25,326	1,668	213	203	190	...	27,600	34,067	119	935	953
March	33,114	1,176	206	253	329	...	35,078	42,677	82	674	531
April	45,843	1,822	351	229	418	10	48,673	32,678	109	1,317	631
May	33,735	1,872	197	399	364	2	36,569	30,411	68	1,075	1,056
Total, five months, 1927..tons	180,664	8,916	1,236	1,383	1,445	12	193,656	.....	484	5,509	3,618
Total, five months, 1926..tons	167,062	6,115	1,715	1,862	1,750	26	.....	178,530	230	4,395	2,669

Compiled from statistics supplied by the Rubber Association of America, Inc.

SEEK FRANCHISE FOR FILIPINO RUBBER PROJECT

D. Haldane-Duncan, representing large financial interests in New York City, and who has been spending several months in Manila and other parts of the Philippine Islands in formulating plans, will apply to the insular legislature when it meets in July for franchises necessary to establish a great rubber planting project in the province of Cottabato, island of Mindanao. It is claimed that a chain of American banks will back the enterprise with $15,000,000, which will be deposited in a Philippine agricultural bank, the funds to be used mainly to finance rubber growers in buying acreage and until they can market latex or rubber.

It is said that the Haldane-Duncan interests plan to utilize a considerable part of the million acres of United States public domain in the island that is available for rubber growing, and that the development can be carried on through a cooperative plan among many rubber growers without modifying the land laws which restrict individual ownership to some 2,500 acres.

The nucleus of the big project will be the Cottabato Rubber Estates, Inc., owned chiefly by Thomas J. Joliff, a Manila business man, and which is of the maximum limit, 2,500 acres. Part of the plans include the building of a 35-mile roadway to carry rubber, or any other plantation products, from the great inland valley to the Cottabato coast. Nearby is Cebu, Bohol, and other islands, all heavily populated and from which ample help may be obtained.

THE TIRE EXPORTS FROM THE FOUR LEADING MANUFACTURING countries of the world have shown an increase during the first quarter of 1927 of 50 per cent, according to statistics prepared by the Department of Commerce. This tabulation indicates that the United States, supplying about 33 per cent of the total, now occupies the leading position, reducing France, which supplied about 31 per cent, to the second place. Canada furnished about 23 per cent and the United Kingdom 13 per cent. In the first quarter of 1926 the share of the United States was 30 per cent; that of France, 35 per cent; Canada, 22 per cent; and the United Kingdom, 13 per cent.

DURING 1925 UNITED STATES EXPORTS OF AUTOMOBILE CASINGS, according to figures prepared by the Department of Commerce, numbered 1,628,219, the value being $21,055,712, and the unit value $12.93. In the year following the shipments declined in number, while the total values and the unit value both represented an advance, the figures being: 1,497,132 casings, value $24,358,907; unit value, $16.27.

UNITED STATES EXPORTS TO THE PHILIPPINES OF TIRES AND TUBES have gained steadily in value in the last few years, the total estimates being: 1923, $723,354; 1924, $820,461; 1925, $1,006,217, and 1926, $1,167,837.

Canada's Rubber Goods Exports

PHILIP M. CRAWFORD
Rubber Division, Department of Commerce

EXPORTS of rubber goods in 1926 from Canada gained over 1925 in every class, states *Commerce Reports*. The total value of exports, $25,620,462, marked a gain of approximately 50 per cent over the $17,135,892 exports of 1925, and the tire class alone in 1926 is large enough to equal the total value of all rubber manufactures exported in 1925.

Because of the rapid expansion of Canadian rubber exports percentage comparisons are dangerous. For example, in 1926 the numerical gain was $8,484,570, compared with a gain of $7,066,686 in 1925. However, because of the larger basic factor, in 1926 the gain was only 50 per cent, compared with a 70 per cent gain in 1925.

Table 1 summarizes the position of Canadian rubber goods exports in 1925 and 1926.

From this table it is evident that the relative position of the classes of rubber goods exported from Canada has not changed materially since 1925. Mechanical rubber-goods exports showed the greatest decline, but were balanced by a corresponding gain in rubber footwear. The tire and the miscellaneous classes remained in approximately the same relative position.

TABLE 1

CANADIAN RUBBER GOODS EXPORTS, BY CLASSES

Item	1925 Value	1925 Per Cent of Total	1926 Value	1926 Per Cent of Total
Tire class	$11,675,845	68.1	$17,525,876	68.4
Footwear class	4,135,310	24.1	6,569,885	25.6
Mechanical class	832,193	4.9	894,176	3.5
Miscellaneous class	492,544	2.9	630,525	2.5
Total	$17,135,892	100.0	$25,620,462	100.0

The United Kingdom was the outstanding direct purchaser of Canadian casings, in 1926 buying almost 18 per cent of the total exports by volume and slightly over 17 per cent by value. Argentina was in second position, followed by New Zealand, Brazil, and Australia, each of these markets buying more than 75,000 casings. These five markets took almost 50 per cent of the Canadian casing exports by volume and more than 45 per cent by value. It is of interest to note that three of these are Empire markets and that these three took more than 32 per cent of the total by volume and more than 34 per cent by value.

Table 2 details the Canadian casing exports to principal markets:

TABLE 2

PNEUMATIC TIRE EXPORTS IN 1926

Destination	Number	Value	Unit value	Per cent of total by Volume	Per cent of total by Value
Total shipments	1,152,070	$14,645,309	$12.71	100.0	100.0
United Kingdom	205,657	$2,522,864	$12.27	17.9	17.2
Argentina	99,637	1,097,764	11.02	8.7	7.5
New Zealand	87,036	1,408,187	16.18	7.6	9.6
Brazil	81,460	727,447	8.93	7.1	5.0
Australia	75,984	1,101,987	14.50	6.6	7.5

Canadian rubber footwear exports, by increasing almost 60 per cent by value, showed the highest percentage of gain of any class of their schedule. This gain was not confined entirely to increased value although it was a factor, as volume of exports increased in very good proportions, as Table 3 shows.

The outstanding Canadian market for rubber boots and shoes in 1926 was the United Kingdom, which bought 1,090,350 pairs of rubber boots and shoes valued at $1,912,179. This one market accounted for more than 65 per cent of Canadian exports of this item and almost 70 per cent by value. Newfoundland and Labrador took 267,012 pairs valued at $288,302, New Zealand 151,120 pairs at $298,789, whereas the leading non-Empire market was Denmark, which bought 43,688 pairs at $87,685. The importance of Empire

TABLE 3

EXPORTS OF RUBBER FOOTWEAR

Item	1925 Quantity	1925 Value	1925 Unit value	1926 Quantity	1926 Value	1926 Unit value
Boots and shoes *pairs*	1,195,827	$1,848,474	$1.55	1,644,130	$2,740,594	$1.67
Canvas rubber-soled shoes *pairs*	3,235,263	2,286,836	.71	4,985,933	3,829,291	.77
Total	.....	$4,135,310	.....	.....	$6,569,885	.....

boot and shoe markets is readily apparent from the fact that in 1926 about 95 per cent of exports of this item, both volume and value, were shipped to Empire markets.

Because of the prominence of Argentina as a market for Canadian rubber-soled shoes, the Empire markets took only 51 per cent of the exports by volume and 55 per cent by value. Of the total exports of Canadian canvas rubber-soled shoes, Argentina took 30 per cent by volume and 26 per cent by value. Table 4 presents the position of the important Canadian markets:

TABLE 4

EXPORTS OF CANVAS RUBBER-SOLED SHOES IN 1926

Destination	Pairs	Value	Unit value	Per cent of total by Volume	Per cent of total by Value
Total shipments	4,985,933	$3,829,291	$0.77	100.0	100.0
Argentina	1,544,824	1,002,844	.65	31.0	26.2
United Kingdom	1,002,142	796,384	.80	20.0	20.8
New Zealand	404,036	321,695	.80	8.1	8.4
Australia	258,697	248,420	.96	5.2	6.5
British India	227,429	186,000	.82	4.6	4.9

In 1925, Canadian exports of rubber boots and shoes totaled only 1,195,827 pairs valued at $1,848,474, a unit value of $1.55 a pair. The important purchasers were the United Kingdom, and Newfoundland and Labrador—these two markets took 1,036,662 pairs or almost 87 per cent of the total Canadian shipments.

Canadian exports of canvas rubber-soled shoes in 1925 totaled 3,235,263 pairs valued at $2,286,836, a unit value of $0.71 a pair. Argentina was the leading purchaser, taking 817,036 pairs at $552,798. The United Kingdom, with 666,054 pairs at $463,029, and New Zealand, with 388,975 pairs at $263,158, and British South Africa, with 277,872 pairs at $157,686, were other important markets.

RUBBER FOOTWEAR EXPORTS

Some interesting statistics regarding exports of rubber footwear by the leading manufacturing countries of the world have been prepared by the Department of Commerce. According to these tabulations, the combined shipments of such goods from the United States, Canada, the United Kingdom and France have risen from a total for 1924 of 16,490,000 pairs to 18,994,000 pairs for 1925, and 22,382,000 for 1926. The corresponding figure for the first four months of 1927 is 6,424,000 pairs, which is not strictly representative, as the peak is usually reached during the summer and fall months.

These shipments of rubber footwear, including rubber boots and shoes, and canvas rubber-soled shoes, have shown a steady advance during the three years for the countries above mentioned, the single exception during 1926 being the United Kingdom. United States exports have been as follows: rubber boots, (1924) 775,000 pairs; (1925) 987,000; (1926) 1,091,000 pairs. Rubber shoes, (1924) 1,681,000 pairs; (1925) 1,106,000; and (1926) 1,486,000 pairs. Canvas rubber-soled shoes, (1924) 4,633,000 pairs; (1925) 5,202,000; and (1926) 5,901,000 pairs.

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